SIQURA®

SURVEILLANCE SOLUTIONS

User Manual

Siqura C-54 E-MC

Firmware Version 3.10

4-channel multicodec video server

Note: To ensure proper operation, please read this manual thoroughly before using the product and retain the information for future reference.

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C-54 E-MC v3.10
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Contents

1 ABOUT THIS MANUAL 1

2 SAFETY AND COMPLIANCE INFORMATION 3

2.1 SAFETY INFORMATION 3
2.2 DECLARATION OF CONFORMITY 6

3 PRODUCT DESCRIPTION 7

3.1 PRODUCT OVERVIEW 7
3.2 FRONT PANEL 9

4 INSTALLATION 11

4.1 POWERING THE UNIT 11
4.2 CONNECTING CABLES 11
4.3 STARTUP 12
4.4 CONNECTOR PIN ASSIGNMENTS 12
4.5 UPDATING DEVICE DEFINITIONS 13

5 CONNECTIONS 15

5.1 ESTABLISHING A NETWORK CONNECTION 15
5.2 MAKING VIDEO AND DATA CONNECTIONS 17

6 INTERFACES 19

6.1 OPEN STREAMING ARCHITECTURE (OSA) 19
6.2 WEB USER INTERFACE 19
6.3 MX/IP 19
6.4 SNMP 20
6.5 SESSION ANNOUNCEMENT PROTOCOL (SAP) 20

7 MEDIA STREAMING VIA RTSP 21

7.1 RTSP AND RTP 21
7.2 TRANSFER VIA UDP OR TCP 22

8 ACCESSING THE INTERNAL WEB SERVER 23

8.1 SYSTEM REQUIREMENTS 23
8.2 LOGIN PROCEDURE 23

9 WEB PAGE FEATURES 25

10 WORKING WITH THE WEB PAGES 27

10.1 LIVE VIDEO 28
10.1.1 Matrix mode 29
10.1.2 Maximized mode 30
10.1.3 PTZ camera control via your browser 31
10.2 STATUS 33
10.2.1 Status tab 33
10.2.2 Measurements tab 34
10.3 NETWORK 35
10.3.1 Advanced Settings 36
10.4 VIDEO # 37
10.4.1 General tab 38
10.4.2 Encoder # tab 40
10.4.2.1 Notes 42

10.4.2.2 Making a Video Connection ... 43
10.4.2.3 Advanced Settings ... 44
10.4.2.4 Meta data insertion ... 52
10.4.2.5 Notes ... 54
10.4.3 Live View tab ... 56
10.4.3.1 Advanced Settings ... 57
10.4.4 OSD tab ... 58
10.4.4.1 Text tab ... 59
10.4.4.2 Graphics tab ... 61
10.4.5 VMD tab ... 63
10.4.5.1 VMD startup ... 63
10.4.5.2 VMD Configuration 1: Detection Parameters ... 64
10.4.5.3 VMD Configuration 2: Setting the mask ... 65
10.4.5.4 VMD detection window ... 66
10.4.5.5 VMD alarm ... 66
10.4.5.6 Advanced Settings ... 66
10.4.6 FTP Push tab ... 68
10.4.7 Image Quality tab ... 71
10.4.7.1 Enabling the Image Quality Monitor ... 72
10.4.7.2 Dial legend ... 73
10.4.7.3 Measurements configuration ... 74
10.4.7.4 Region of Interest (ROI) ... 76
10.4.8 Tampering Detector tab ... 77
10.4.8.1 Enabling the Tampering Detector ... 77
10.4.8.2 Reference images ... 78
10.4.8.3 Position measurement ... 81
10.4.8.4 Alarms ... 82
10.5 DATA RS-422/485 ... 84
10.5.1 Advanced Settings ... 87
10.6 PTZ ... 90
10.6.1 Enabling PTZ camera control ... 90
10.6.2 Uploading/Removing PTZ drivers ... 91
10.6.3 Data settings ... 91
10.7 EVENT MANAGEMENT ... 92
10.8 DEVICE MANAGEMENT ... 93
10.8.1 General tab ... 93
10.8.1.1 Advanced Settings ... 94
10.8.2 SNMP tab ... 94
10.8.3 MX tab ... 96
10.8.4 Auto Discovery tab ... 97
10.8.5 Firmware tab ... 99
10.8.6 Reboot tab ... 100
10.9 USER MANAGEMENT ... 101
10.9.1 Web Access tab ... 101
10.9.2 Linux tab ... 102
10.10 DATE AND TIME ... 103
10.10.1 Advanced Settings ... 104

11 MULTICASTING, MULTI-UNICASTING, AND PORT NUMBERS ... 105

11.1 MULTICASTING ... 105
11.2 MULTI-UNICASTING ... 106
11.3 PORT NUMBERS ... 106

12 APPENDIX: ENABLING JAVASCRIPT ... 107

13 APPENDIX: VIDEO PLAYER PLUG-IN INSTALLATION ... 109

13.1 QUICKTIME ... 109
13.2 VLC ... 110

14 APPENDIX: TECHNICAL SPECIFICATIONS 111

1 About This Manual

Document scope

This manual applies to C-54 E-MC v3.10, Siqura's 4-channel multicodec video server.
It offers detailed information on:

- How to install the unit
- How to establish connections
- How to communicate with the unit
- How to operate the unit
- How to configure the unit's settings

Intended audience

This manual is aimed at network engineers, technicians, and operators involved in the installation and operation of network devices, such as the C-54 E-MC.

Assumed skills and know-how

To work with a C-54 E-MC unit, a technician or operator must have adequate knowledge and skills in the fields of:

- Installing electronic devices
- Ethernet network technologies and Internet Protocol (IP)
- Windows environments
- Web browsers
- Video, audio, data, and contact closure transmissions
- Video compression methods

Specifications

The information given in this manual was current when published. Siqura reserves the right to revise and improve its products. All specifications are subject to change without notice.

Important information

Before proceeding, please read and observe all instructions and warnings in this manual. Retain this manual with the original bill of sale for future reference and, if necessary, warranty service. When unpacking your product, check for missing or damaged items. If any item is missing, or if damage is evident, do not install or operate this product. Contact your supplier for assistance.

Acknowledgement

Siqura units use the open-source Free Type font-rendering library.

2 Safety and Compliance Information

This chapter contains the C-54 E-MC safety instructions and compliance information.

In This Chapter

Safety Information 3
Declaration of Conformity 6

2.1 Safety Information

Introduction

The safety information contained in this section, and on other pages of this manual, must be observed whenever this unit is operated, serviced, or repaired. Failure to comply with any precaution, warning, or instruction noted in the manual is in violation of the standards of design, manufacture, and intended use of the module. Siqura assumes no liability for the customer's failure to comply with any of these safety requirements.

Trained Personnel

Installation, adjustment, maintenance, and repair of this equipment are to be performed by trained personnel aware of the hazards involved. For correct and safe use of the equipment and in order to keep the equipment in a safe condition, it is essential that both operating and servicing personnel follow standard safety procedures in addition to the safety precautions and warnings specified in this manual, and that this unit be installed in locations accessible to trained service personnel only.

Safety Requirements

The equipment described in this manual has been designed and tested according to the **UL/IEC/EN 60950-1** safety requirements.

Warning: If there is any doubt regarding the safety of the equipment, do not put it into operation.

This might be the case when the equipment shows physical damage or is stressed beyond tolerable limits (for example, during storage and transportation).

Important: Before opening the equipment, disconnect it from all power sources.

The equipment must be powered by a *SELV*[*] power supply. This is equivalent to a Limited Power source (LPS, see UL/IEC/EN 60950-1 clause 2.5) or a "NEC Class 2" power supply. When this module is operated in extremely elevated temperature conditions, it is possible for internal and external metal surfaces to become extremely hot.

[*] SELV: conforming to IEC 60950-1, <60VDC output, output voltage galvanically isolated from mains. All power supplies or power supply cabinets available from Siqura comply with these SELV requirements.

Optical Safety (C-54 E-MC /SFP)

This optical equipment contains Class 1M lasers or LEDs and has been designed and tested to meet **IEC 60825-1:1993+A1+A2** and **IEC 60825-2:2004 safety class 1M** requirements.

Warning: Optical equipment presents potential hazards to testing and servicing personnel, owing to high levels of optical radiation.

When using magnifying optical instruments, avoid looking directly into the output of an operating transmitter or into the end of a fiber connected to an operating transmitter, or there will be a risk of permanent eye damage. Precautions should be taken to prevent exposure to optical radiation when the unit is removed from its enclosure or when the fiber is disconnected from the unit. The optical radiation is invisible to the eye.

Use of controls or adjustments or procedures other than those specified herein may result in hazardous radiation exposure.

The installer is responsible for ensuring that the label depicted below (background: yellow; border and text: black) is present in the restricted locations where this equipment is installed.

EMC

The equipment has been tested and found to meet the CE-regulations relating to EMC, and complies with the limits for a Class B device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against interference to radio communications in any installation. The equipment generates, uses, and can radiate radio frequency energy; improper use or special circumstances may cause interference to other equipment or a performance decrease due to interference radiated by other equipment. In such cases, the user will have to take appropriate measures to reduce such interactions between this and other equipment.

Any interruption of the shielding inside or outside the equipment could make the equipment more prone to fail EMC requirements.

Non-video signal lines must use appropriate shielded Cat 5 cabling (S-FTP), or at least an equivalent. Ensure that *all* electrically connected components are carefully earthed and protected against surges (high voltage transients caused by switching or lightning).

ESD

Electrostatic discharge (ESD) can damage or destroy electronic components. *Proper precautions should be taken against ESD when opening the equipment.*

Care and Maintenance

The encoder will normally need no maintenance. In order to keep the module operating reliably, please observe the following.

- Prevent dust from collecting on the module.
- Do not expose the equipment to moisture.
- Keep the module within the appropriate temperature range as described in the Technical Specifications section.

RoHS Statement

Global concerns over the health and environmental risks associated with the use of certain environmentally-sensitive materials in electronic products have led the European Union (EU) to enact the Directive on the Restriction of the use of certain Hazardous Substances (RoHS) (2002/95/EC). Siqura offers products that comply with the EU's RoHS Directive. The full version of the Siqura RoHS statement can be viewed at www.siqura.com.

Product Disposal

The unit contains valuable materials which qualify for recycling. In the interest of protecting the natural environment, properly recycling the unit at the end of its service life is imperative.

When processing the printed circuit board, dismantling the lithium battery calls for special attention. This kind of battery, a button cell type, contains so little lithium, that it will never be classified as reactive hazardous waste. It is safe for normal disposal, as required for batteries by your local authority.

2.2 Declaration of Conformity

CE

MANUFACTURERS DECLARATION
OF CONFORMITY FOR

Product identification

Product:	IP / Ethernet MPEG-2 / MPEG-4 / H.264 video en/decoder
Brand:	Siqura, Optelecom-NKF
Model/type:	**C-44**, **S-44**, **C-54**, **S-54**, **C-50**, **S-50**, **C-60**, **S-60** , **S-64**, **S68** series and **A-80** and **TrafficServer** series
Versions:	A-80 (b) , C-xx (a)-(b), S-xx (a)-(b), TrafficServer (b) xx is 44, 50, 54, 60, 64 or 68 (a) will be replaced by: E or D (b) may be replaced by any combination of alphanumeric characters, May be followed by: SFP, may be followed by: /SA. Rackmount in MC10 MC11 series or stand alone (/SA),
Ratings:	11-19VDC; 0.8A
Tested:	System is tested in a typical configuration

Manufacturer

Name:	Optelecom-NKF B.V.	Optelecom-NKF, Inc.
Address:	Zuidelijk Halfrond 4 2801 DD Gouda, The Netherlands www.optelecom-nkf.com	12920 Cloverleaf Center Drive Germantown, MD 20874, USA www.siqura.com

Means of conformity

In conformity with provisions of the following EC directives:
LVD: 2006/95/EC, EMC: 2004/108/EC, 89/336/EEC,

A sample of the product has been tested by

Safety:	Underwriters Laboratories Inc. (UL) Arnhem, The Netherlands
UL File:	E242498, part A16 Note on UL: A-80 not yet in UL file, hardware tested by Optelecom-NKF.
Standards:	UL 60950-1:2007, CSA C22.2 No 60950-1-07, IEC 60950-1:2005, Information Technology Equipment – Safety - Part 1: general requirements.
EMC:	D.A.R.E!! Consultancy B.V. , Woerden, The Netherlands
Standards:	EN 61000-6-3:2007 – Generic Emission Standard (residential environm.) EN 55022 (Class B/A), FCC 47 CFR 15 (Class B/A), EN 61000-3-2, EN 61000-3-3. EN 61000-6-2:2005 – Generic Immunity Standard (industrial environm.) EN 55024, EN 61000-series: Parts: 4-2, 4-3, 4-4, 4-5, 4-6, 4-11.

Signature

P. J. de Konink
Product Manager
Gouda, 2010 June 25.

W.D. Hermelink
Product Certification Engineer

c UL us CE

3 Product Description

The Siqura C-54 E-MC multicodec video server is an open and versatile 4-channel solution for IP video monitoring applications, made to operate under extreme outdoor conditions. This chapter introduces the unit to you by outlining its main features.

In This Chapter

Product Overview C-54 v3.10 7
Front Panel 9

3.1 Product Overview

General

The Siqura C-54 E-MC is a field-hardened 4-channel video server for IP applications, capable of streaming MPEG-2, MPEG-4, and MJPEG simultaneously. In addition to unidirectional video, the C-54 E-MC offers an independent bidirectional data channel.

Models

The C-54 E-MC can be housed in a Siqura MC 10 or MC 11 power supply cabinet, but is also available as a stand-alone module (/SA version). The C-54 E-MC is optionally available with a pluggable SFP slot for connections via a fiber optic cable (/SFP). A range of multimode or single-mode XSNet™ SFP devices fit the empty SFP slot. Front panel LEDs indicate network status, stream status (sync), data activity, no video, and DC power. All models have backup battery power for their clocks.

Multicodec and multistreaming

The C-54 E-MC is capable of streaming MPEG-2, MPEG-4, and MJPEG simultaneously. Each stream is optimized for its purpose (for instance, high-quality MPEG-2 for live viewing, low-bandwidth MPEG-4 for storage, and low-resolution MJPEG for web applications and remote devices). A total of six copies per channel – three per independent MPEG-2, MPEG-4, or MJPEG video stream – can be transmitted to different unicast and/or multicast destinations using Siqura's proprietary MX protocol. The C-54 E-MC supports source-specific multicast (SSM). Up to forty streams can be retrieved using RTSP. It is also possible to use the Session Announcement Protocol (SAP) to transmit MPEG-2 and MPEG-4 streams to multicast destinations.

Per channel, the C-54 E-MC also has a Live View Encoder that can convert the analog video input signal to MJPEG format for streaming to web applications or remote devices using HTTP pull method.

Data

By combining streaming video with serial data over IP, the C-54 E-MC provides the necessary interface for any CCTV application (PTZ control, access control, etc.). Internal Video Motion Detection can be used for automated security solutions or event-triggered storage.

Web interface

Configuration, management, and live viewing are simplified by the access-controlled web interface. Full in-band control is available through Siqura's MX™ Configuration Tool Kit or the HTTP API. The C-54 E-MC is field-upgradeable.

Image quality monitoring and tampering detection

The C-54 E-MC 's built-in image quality monitoring and tampering detection functionality can raise an alert when a camera no longer produces a usable picture, when it is blocked, or when the camera position has changed.

Video Motion Detection (VMD)

The C-54 E-MC is fitted with a motion detector, which will raise an event when a certain amount of motion is detected in a predefined area in the image. The motion detector runs real-time on the live images; the detection itself is based on 'averaged pixel change'. The region of interest (ROI) is obtained by masking the parts of the image of less or no interest, such as trees or a fountain which would otherwise trigger false events. The mask can be drawn freely over the image.

FTP Push

On the occurrence of an event the C-54 E-MC can post a JPG image on a remote server. The unit pushes the image to one or two FTP servers. The event can be triggered externally, by VMD, the Image Quality Monitor, Tampering Detector, etc., or the C-54 E-MC can periodically upload images to the remote server(s).

Compatibility

The C-54 E-MC is part of Siqura, a complete offering of video surveillance equipment and solutions. Siqura offers video codecs/servers, IP cameras, video management, network storage, and configuration software. The C-54 E-MC is designed to comply with the worldwide adopted standards for streaming video. Its Open Streaming Architecture (OSA) offers standardized streaming video and remote control. All streaming protocols are based on approved standards and tested with different vendors. A comprehensive HTTP API gives access to all controls and makes integration with third-party VMS easy. The API is available at www.siqura.com. In addition, the C-54 E-MC supports Siqura's unique MX™ protocol.

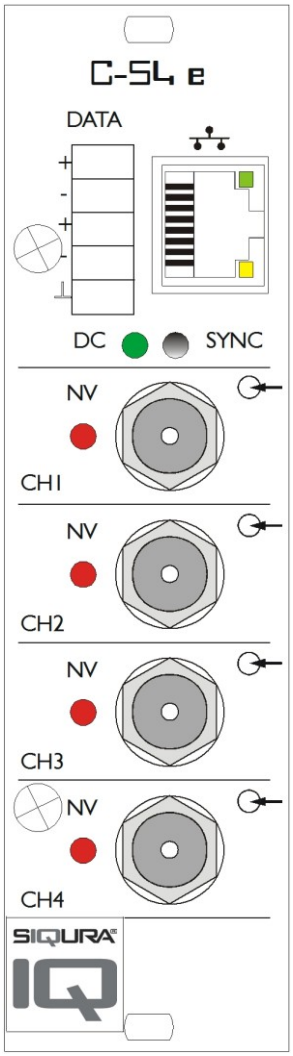
3.2 Front Panel

Features and indications

The front panel of the C-54 E-MC has the following features.

C-54 E		
	4 BNC connectors	video input
	RJ-45 socket or SFP	Ethernet I/O, electrical or fiber
DATA	5-pin mini Combicon connector	RS-422/485 data in/out (upper), out (lower)
Status indicator LEDs		
***SYNC**	off	all streams disabled
	green	all enabled streams OK
	red	a transmitted stream fails
	yellow	a received stream fails
	red/yellow blink	at least one transmitted and at least one received stream fail
***DC**	green	DC power OK; blinks on *identification* (on page 94) and errors
***NV**	red	no video on input
Ethernet sockets LEDs	green/yellow	Green on/off: 100/10 Mbit Yellow on/blink: link OK, active Yellow off/flash: link down, TX attempt

C-54 E-MC front panel features and indications



For pin assignments, see *Connector Pin Assignments* (on page 12).

4 Installation

This chapter describes how to install your C-54 E-MC unit and connect power, network, and signal cables.

In This Chapter

Powering the Unit 11
Connecting Cables..... 11
Startup..... 12
Connector Pin Assignments 12
Updating Device Definitions..... 13

4.1 Powering the Unit

To power a rack-mount unit

1. Insert the C-54 E-MC into a Siqura MC 10 or MC 11 power supply cabinet.
2. Plug the cabinet power cord into a grounded mains socket.

To power a stand-alone unit

The stand-alone version (/SA) of the C-54 E-MC requires an external power supply adapter (12 VDC).

1. Connect the power adapter to the power connector on the metal SA housing.
2. Plug the power adapter into a grounded mains socket.

4.2 Connecting Cables

To connect the C-54 E-MC to your 100/10Mbit IP/Ethernet network

- Plug the network cable into the RJ-45 Ethernet socket on the C-54 E-MC front panel.

Important: Use appropriate cabling (Cat 5 or Cat 6) for network links.

To connect a video source

- Connect the coaxial cable from your video source (a camera, for example) to the video input BNC connector on the C-54 E-MC front panel.

To connect data sources/destinations

- Plug the cable carrying the data signals into the RJ-45 DATA socket on the C-54 E-MC front panel.

Important: Through-connecting the signal ground lines of RS-data interfaces is mandatory, as is proper grounding. See also the section on pin assignments later in this chapter.

4.3 Startup

After startup, the DC LED will light and the network indicator lights will go through an on/off sequence.

The power DC LED should always be lit; the link and No Video lights will eventually glow upon establishing of a good network link and the absence of an input video signal, respectively.

The sync LED displays as described in the *Front Panel* section.

Important: Before any signal connection can be made, at least a valid IP address (the unit's identity for the network) and a subnet mask must be assigned to the unit. Refer to the *Connections* chapter for details on how this can be done.

4.4 Connector Pin Assignments

Mini Combicon connector pin assignments

Correctly connecting the + and - inputs and outputs on the C-54 E-MC's green mini Combicon connector to the inputs and outputs on other equipment such as cameras, for example, requires special attention!

Warning: Do *not* reverse the wires. Make sure you connect the 'plus' signal lines on the codec to the like 'plus' signal lines on the other device, and likewise for the 'negative' to 'negative' signals.

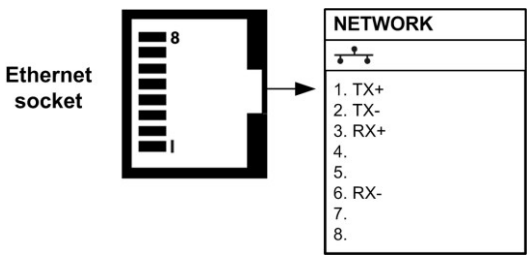
Do not forget to connect ground!

Top to bottom

Pin 1	RS-485-4w/422 in +	RS-485-2w in/out +
Pin 2	RS-485-4w/422 in -	RS-485-2w in/out -
Pin 3	RS-485-4w/422 out +	
Pin 4	RS-485-4w/422 out -	
Pin 5	GND	GND

Pin assignments of the mini Combicon data connector

Ethernet connector pin assignment



Ethernet connector socket pinning

4.5 Updating Device Definitions

If the C-54 E-MC is not supported by the Siqura application software on your host PC you can download EMX updates and MX Plug-in updates at www.siqura.com. Install the EMX update first if you are performing both update types.

Note: There is no need to install these updates if you do not use MX applications.

- **EMX updates**
  Install the EMX update using the Showroom menu. The Embedded MX network driver will be updated with the latest changes.

- **MX Plug-in updates**
  The updater will update the shared copy of device definitions used by Ethernet-based Siqura MX applications, such as Operator Storage, Operator Office, MX Viewer, MX Configuration Tool, and the MX SDK. An existing installation of the SNM Configuration and Service Tool will also be updated.

5 Connections

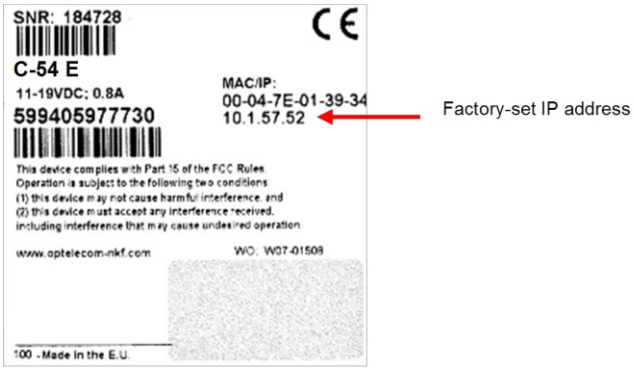
With your Siqura unit installed, the next step is to establish an IP connection and set up video and (if applicable) other signal links. This chapter describes how to change the factory-set IP address and subnet mask of the C-54 E-MC to be compatible with the network segment in which the unit will be used. Additionally, it discusses how to configure signal streaming.

In This Chapter

Establishing a Network Connection 15
Making Video and Data Connections 17

5.1 Establishing a Network Connection

The factory-set IP address of the C-54 E-MC is in the 10.x.x.x range. You will find it printed on a sticker on the unit.


SNR: 184728
C-54 E
11-19VDC; 0.8A
599405977730
MAC/IP:
00-04-7E-01-39-34
10.1.57.52
Factory-set IP address
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received,
including interference that may cause undesired operation.
www.optelecom-nkf.com
WO: W07-01509
100 - Made in the E.U.

C-54 E-MC product sticker

Note: This is the address the unit will revert to if you issue a *Reset to factory settings; incl. network settings* (on page 100) command and reboot the unit.

To open communication with the C-54 E-MC from a host PC and change the unit's network settings, perform the following steps.

Step 1: Set the PC's network adapter to the unit's factory default subnet and connect the two devices.

Step 2: Access the unit from a web browser or other tool installed on the PC.

Step 3: Set the unit's IP address and subnet mask to the subnet it will be used in and reboot the unit.

To address the unit from the same PC again, configure the PC's network adapter once more to assign the PC to the same subnet as the unit.

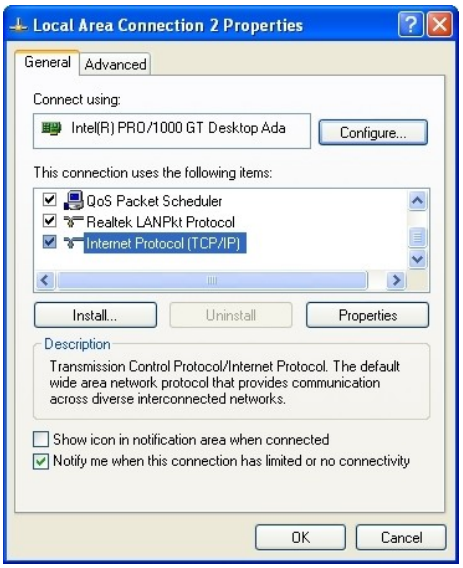
Step 1: Setting the host PC to the factory default subnet of the unit

To configure the network adapter on the host PC

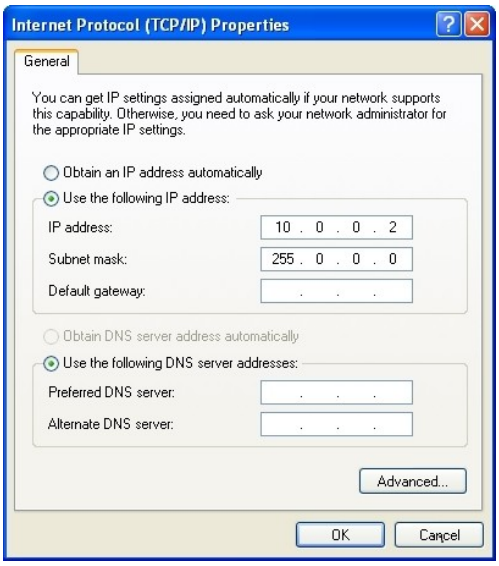
1. In the Control Panel, open **Network Connections**.
2. Right-click the connection to be configured, and select **Properties**.
3. In the items list, select **Internet Protocol (TCP/IP)**.
4. Click **Properties**.
5. In the Internet Protocol (TCP/IP) Properties dialog, click **Use the following IP address**.
6. Enter an IP address that will assign your PC to the same subnet as the unit (i.e., within the 10.x.x.x range). Use 255.0.0.0 as a subnet mask.

   Important: To prevent conflicts, be sure to choose a unique IP address. No two devices on a network can have the same IP address.

7. To apply the new settings, click **OK**, and then click **Close**.



Opening IP settings on the host PC


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 2
Subnet mask:
255 . 0 . 0 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Changing host PC IP settings to the factory-default settings of the unit

At this point, connect your PC to the C-54 E-MC. You can connect them directly using a crossover cable, or connect both to a switch.

Step 2: Accessing the unit

Using a standard web browser you can now log on to the C-54 E-MC's internal web server.

Step 3: Changing the unit's network settings

The Network web page enables you to make the unit's network addressing compatible with the network it will be hooked into. You can set a fixed IP address or have the IP address assigned by a DHCP server. In the latter case, open the Advanced Settings and enable DHCP. Do not forget to save and reboot the unit after changing the settings.

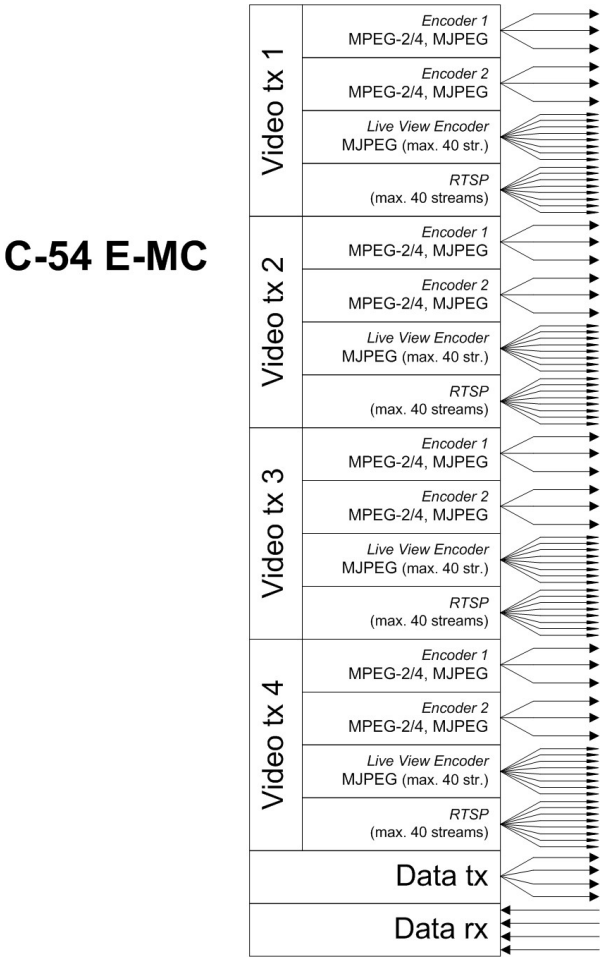
5.2 Making Video and Data Connections

Connection methods

With the C-54 E-MC's IP connection established, video and data connections can be made. A convenient way to do so is to use the unit's internal web pages. For an elaborate description, see the *Working with the Web Pages* chapter. Separate application software, such as Siqura's MX Configuration Tool, can be used as well. The easiest way to connect with video is by using RTSP or SAP; for more detailed information, refer to the *Interfaces* chapter.

Streams and connectors

Each signal stream transmitted and received by the C-54 E-MC (see the figure below) can be conceived of as using virtual connectors (transmitters and receivers) on the network side. Each of the unit's virtual connectors has a name; through the internal web pages, the receivers can be assigned a port number that must be used only once for that particular device. Depending on context, the assignment is automatic or manual. Note that port numbers must be even.



Link facilities of the C-54 E-MC.

All arrows represent separate and independent connections over Ethernet.

The abbreviations 'tx' and rx' refer to the network side of the module.
- tx: the stream is transmitted to the network
- rx: the stream is received from the network

General procedure for making links

In both connection methods mentioned above, making a unicast one-way video or data link from source to destination entails at least the following steps:

- In the transmitter, specify a destination IP address and a destination port number.
- In a compatible receiver, specify the transmitter IP address (source) and the local input port number (= the destination port number mentioned above).
- Do not forget to enable both the transmitter and the receiver.

It is possible for external software to configure a stream, for instance a video stream. In such cases, port numbers are assigned automatically from a range of unused values.

For more information on port numbers, see *Port Numbers* (on page 106).

6 Interfaces

A variety of methods can be employed to communicate with the C-54 E-MC. This chapter outlines the interfaces you can use to control the unit and manage the media streams it is handling.

In This Chapter

Open Streaming Architecture (OSA) 19
Web User Interface 19
MX/IP 19
SNMP 20
Session Announcement Protocol (SAP) 20

6.1 Open Streaming Architecture (OSA)

Siqura's Open Streaming Architecture (OSA) consists of a standard set of open communication protocols to govern media streaming via RTSP and equipment management via HTTP. The *Siqura Protocol for PTZ Cameras and Codecs* enables easy integration of the C-54 E-MC with third-party products. The protocol consists mainly of different CGI (Common Gateway Interface) program calls for listing and configuring parameters. For detailed information, refer to Siqura's *PTZ Camera and Codec Programming Interface* specification. You can download this HTTP API specification at www.siqura.com.

6.2 Web User Interface

Using the C-54 E-MC's internal web server is the most straightforward way to access the unit. The C-54 E-MC's web pages enable you to configure the unit's settings and view live video images from a standard web browser, eliminating the need for a separate application program.

6.3 MX/IP

MX/IP, a proprietary Siqura protocol, offers direct access to the unit's settings contained in the *Management Information Base* (MIB), a list of variables stored inside the unit. The MIB can be read and/or written with special MX software. *MX Configuration Tool*, for example, offers full control of the C-54 E-MC through the MIB, enabling you to remotely configure device settings and manage media streams. Additionally, MX viewing and control software offers real-time monitoring of video streams (Operator Office, MX Viewer Lite) and playback of recorded images (Operator Storage). For more details on the MX/IP protocol, the MIB and Siqura's EMX network service, refer to the manuals documenting the MX Software Development Kit and the above programs.

Note: If you prefer using open standards, you can go to the unit's Device Management web page and disable the MX/IP protocol on the MX tab of this page. Be aware that doing so prevents you from upgrading the C-54 E-MC firmware through MX Firmware Upgrade Tool.

6.4 SNMP

The Simple Network Management Protocol (SNMP), part of the internet protocol suite, can be used to monitor network devices such as the C-54 E-MC for conditions or events that require administrative attention. For more details, refer to appropriate literature on SNMP.

The C-54 E-MC supports in-band SNMP. Via SNMP several status variables can be read and traps can be generated on events. C-54 E-MC SNMP settings can be configured on the SNMP tab of the unit's Device Management web page.

The SNMP Agent is MIB-2 compliant and supports versions 1 and 2c of the SNMP protocol. The MIB database can be downloaded at www.siqura.com.

6.5 Session Announcement Protocol (SAP)

The C-54 E-MC supports the Session Announcement Protocol (SAP). This is a protocol for broadcasting multicast session information. A SAP listening application can listen to the announcements advertised by the C-54 E-MC SAP announcer. The application can use this information to receive a video stream transmitted by the C-54 E-MC to the advertised multicast address. For more details, refer to the description of the Video web pages.

7 Media Streaming via RTSP

The easiest way to extract a video stream from the C-54 E-MC is to use the Real-Time Streaming Protocol (RTSP). This chapter explains the role of the C-54 E-MC in RTSP media sessions and describes how to open a video stream from the C-54 E-MC in a video player plug-in.

In This Chapter

RTSP and RTP..... 21
Transfer via UDP or TCP..... 22

7.1 RTSP and RTP

The C-54 E-MC implements an RTSP server. A hardware or software decoder (the latter within a viewing application, for example) is the RTSP client. Media sessions between client and server are established and controlled with RTSP. Media stream delivery itself is handled by the Real-Time Transport Protocol (RTP). The C-54 E-MC supports video streaming via UDP and TCP.

Example

Use the following URL format to get a stream into, for example, VLC or QuickTime.

rtsp:// <ip-address of encoder>/VideoInput/<x>/<y>/<z>

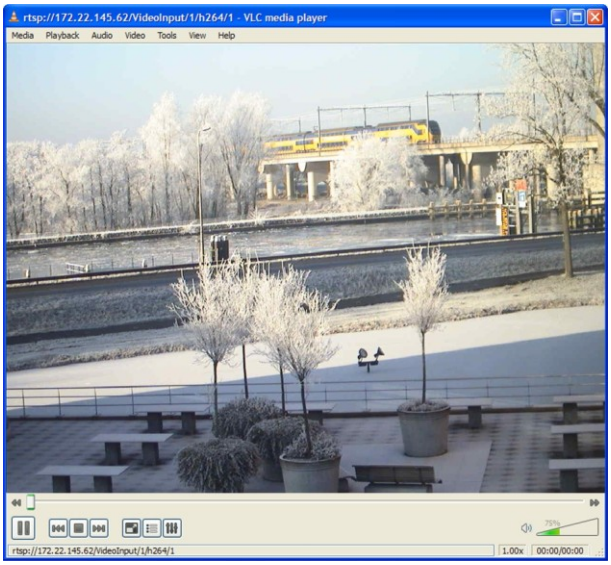
where:

<**x**> is the Video Input number
<**y**> is the media type of the required encoder
<**z**> is the logical encoder number

RTSP URL format

The stream in the above figure would be pulled from the encoder with the IP address 172.22.250.129, using Video Input 1, media subtype MPEG-4, and logical encoder 1. Note that the media subtype must be specified without a hyphen.

Note: The encoder should be enabled and set to the correct media type. RTSP is a streaming protocol taking care of stream control. It does not handle device configuration.



C-54 E-MC video stream viewed in VLC

7.2 Transfer via UDP or TCP

The C-54 E-MC reports to the client that it supports transfer over UDP and TCP. The choice is made on the client side. In VLC, for example, using a TCP connection can be forced (*Preferences > Inputs and Codecs > Network > RTP over RTSP (TCP)*).

For more details on controlling C-54 E-MC media streams through HTTP and RTSP, refer to Siqura's *PTZ Camera and Codec Programming Interface* specification. You can download this HTTP API specification at www.siqura.com.

8 Accessing the Internal Web Server

The web pages of the C-54 E-MC offer a user-friendly interface for configuring the unit's settings and viewing live video images over the network. This chapter explains how to connect to the C-54 E-MC's built-in web server.

In This Chapter

System Requirements..... 23
Login Procedure..... 23

8.1 System Requirements

To access the C-54 E-MC's web pages you need the following:

- A PC with a web browser installed.
- An IP connection between the PC and the C-54 E-MC.

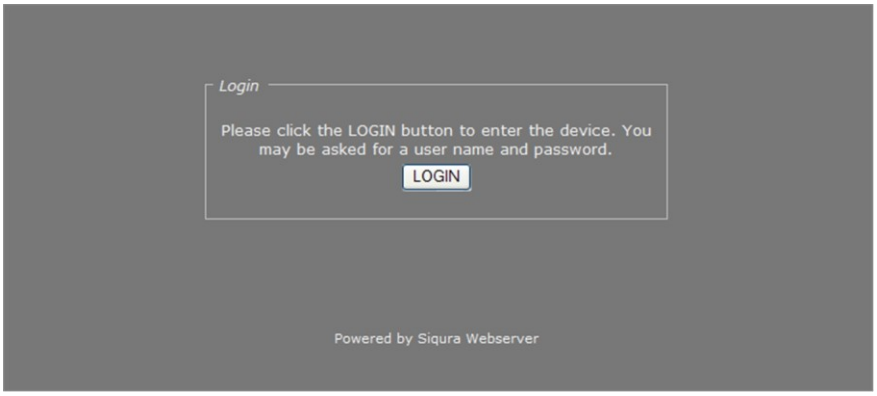
8.2 Login Procedure

To log on to the unit's internal web server

1. Open your web browser.
2. Enter the C-54 E-MC 's IP address in the address bar of the web browser.
   If your network configuration is correct you are directed to the unit's login page.
   If the login page does not display correctly you may need to enable JavaScript in your web browser (see Appendix: Enabling JavaScript).
3. In the Login section, click **LOGIN**.
4. In the Connect box, log in as either "admin" or "root".
   The default login is "admin" with an empty password.
5. Click **OK** or press ENTER.
   Upon successful login, the Live Video page, the home page of the unit, displays.

Important: Logging in as "root" confers admin rights plus additional rights associated with the root account. Therefore, this account should *always* be password protected.

Entering the unit's IP address in the browser's address bar


Login
Please click the LOGIN button to enter the device. You may be asked for a user name and password.
LOGIN
Powered by Siqura Webserver

C-54 E-MC login page

Connect to 10.1.81.63
The server 10.1.81.63 at Siqura requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name:
admin
Password:
Remember my password
OK
Cancel

Connect box

9 Web Page Features

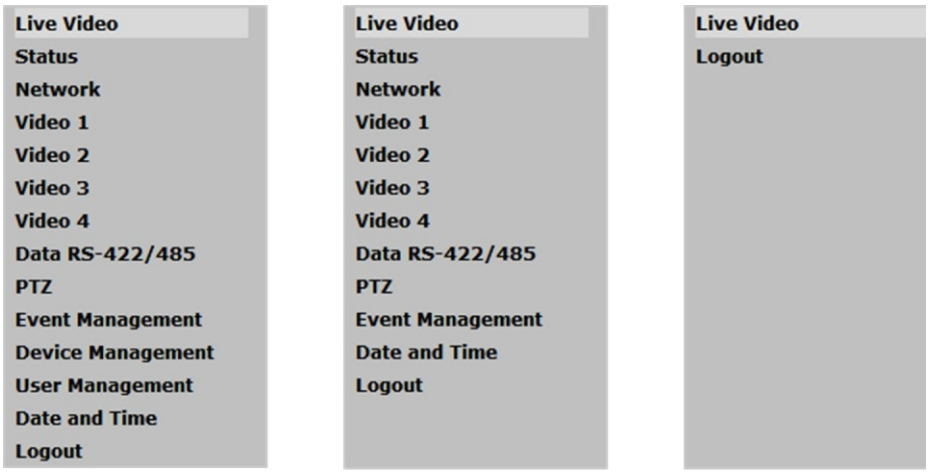
Navigation Menu

Using the menu on the left of each web page you can navigate to the other web pages. The first option in the menu is the home page of the C-54 E-MC. The pages listed below the home page enable you to view and configure the device settings of the unit.

Three-level access control

Whether a specific C-54 E-MC web page is visible and available to you on the navigation menu depends on the user account you logged in with. The unit has three access levels: *Admin*, *Operator*, and *Viewer*. Admins have full access to the web pages. They can create, edit, and delete user accounts on the User Management page. The Operator level grants access to the device configuration pages, but not to user management or device management. Viewer access is restricted to the home page.

A special account is the 'root' account. Logging in with this account (user name = root) confers Admin rights plus additional rights associated with the root account. The root account should *always* be password protected. For more information, refer to the description of the User Management page.



C-54 E-MC menu options available to (from left to right) Admin, Operator, and Viewer accounts

Logging out

Selecting the Logout option on the navigation menu logs out the current user and displays the Login box.

Sections, buttons, and tabs

Apart from the menu, the web pages share the following features.

- Sections showing parameter values, some of which are editable.
- Buttons, mainly *Save* and *Cancel*, for sections with editable fields.
- Tabs (on several pages) used to organize page content.
- Check boxes used to select various features.

After editing, press **Save** to write changes to the unit.
Press **Cancel** to undo unsaved changes and show the values as they were prior to editing.

Note: Some sections (those on the VMD tab of the Video page, for example) do not have *Save* and *Cancel* buttons. Changes you make there are immediately written to the unit.

Some web pages/tabs have an *Advanced Settings* section which is displayed by clicking **Advanced >>**. Click **<< Simplified** to hide the Advanced Settings.

Important: Please be aware that configuring advanced settings requires in-depth understanding of the impact of your changes on the workings of your C-54 E-MC unit. If in doubt, do *not* change the default values.

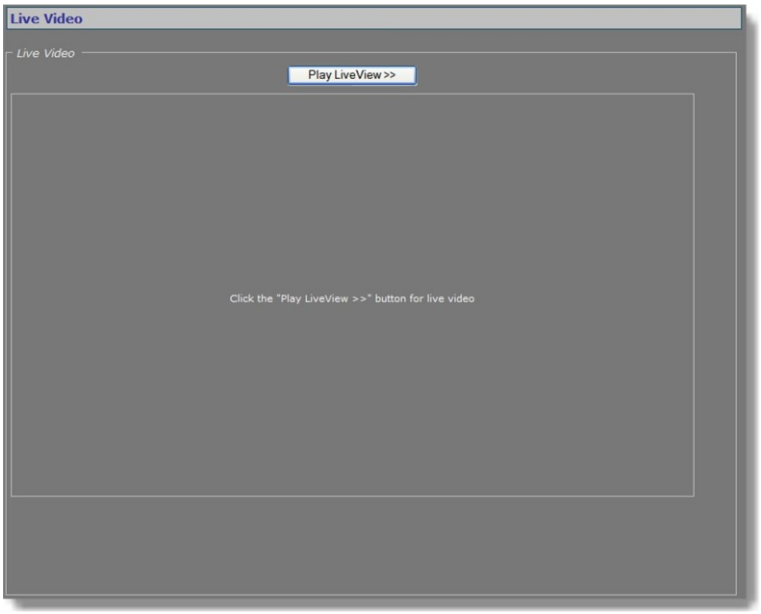
10 Working with the Web Pages

A standard web browser on a desktop or laptop PC with a connection to your video network is all it takes to view live video encoded and streamed by the C-54 E-MC. Working with the web pages you can also control a connected PTZ camera, configure the C-54 E-MC's device settings, and remotely upgrade the embedded software. This chapter provides a detailed description of the individual web pages.

In This Chapter

Live Video 28
Status 33
Network 35
Video # 37
Data RS-422/485 84
PTZ 90
Event Management 92
Device Management 93
User Management 101
Date and Time 103

10.1 Live Video



Live Video page, Live View inactive

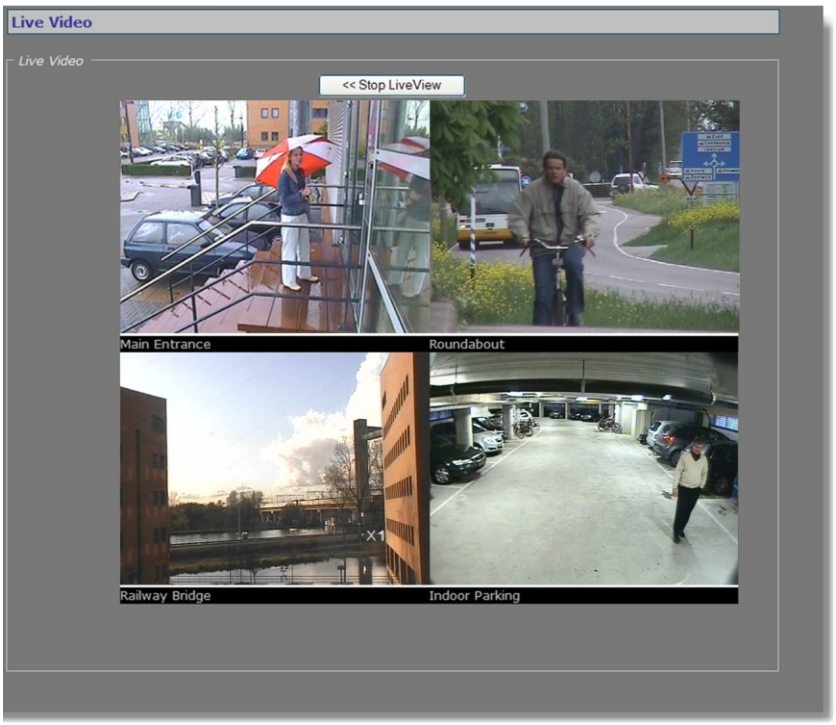
Home page

After a successful login, the home page of the C-54 E-MC displays. On this page, named Live Video, you can view live images from the video source(s) connected to the unit. The Live View function is inactive when the page opens.

To activate Live View

- Press the **Play LiveView>>** button.

10.1.1 Matrix mode



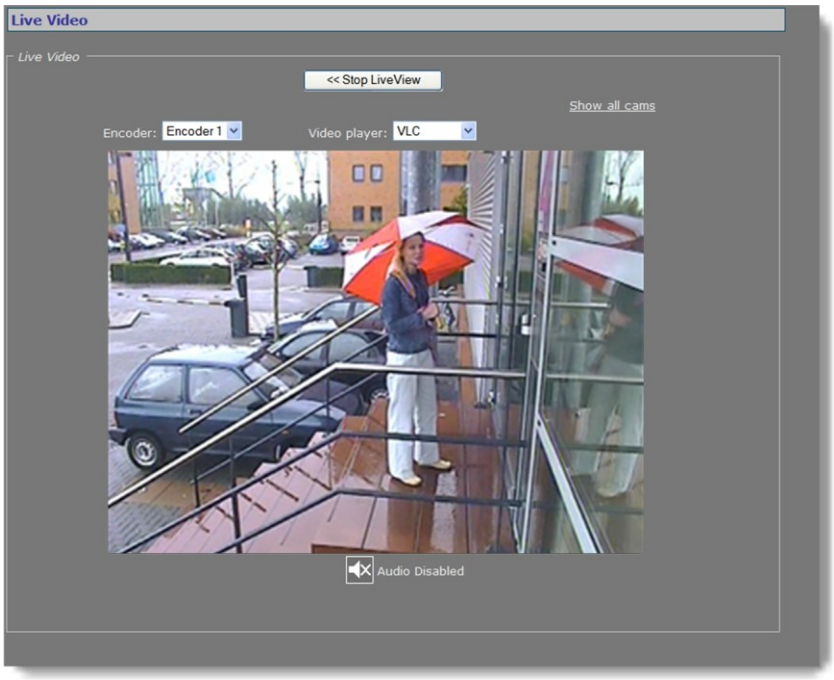
Live Video page, matrix mode

Previews

Live View opens in matrix mode, offering an overview of the video inputs. The video images in the matrix are previews, digitally encoded and compressed by each channel's Live View encoder. For more information about this encoder, see *Live View tab* (on page 56).

If a preview shows a "Live View Encoder Disabled" message, you need to enable the encoder associated with the preview. This is done on the Video # page, where each encoder has its own tab.

10.1.2 Maximized mode



Live Video page, maximized mode

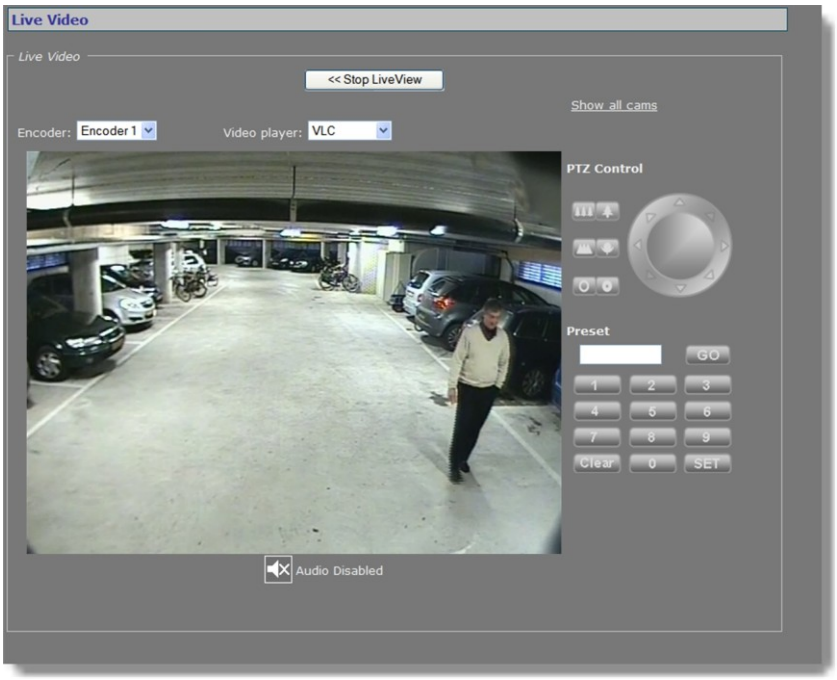
Entering maximized mode

For better observation, you can click an individual preview in the matrix to enter maximized mode. This enlarges the preview and brings it to the foreground, hiding the other images. In maximized mode, the Live Video page has the following elements.

Live Video

<<Stop Live View	Closes the preview.	
Show all cams	Reopens matrix mode.	
Encoder	*Live View*	The video encoder used to encode the images seen in the preview on this page. Live View Encoder previews are transported to the web page using the HTTP protocol. MPEG-2/4 previews are streamed over RTSP.
	Encoder 1	
	Encoder 2	
Video player	*QuickTime*	The video player plug-in used for the previews on this page and the Video page.
	VLC	
	No Player	The C-54 E-MC supports QuickTime and VLC. If neither is detected on the host machine the Video player list has a “No Player” indication. For more information, refer to Appendix: Video Player Plug-In Installation.
Refresh rate	Available in Live View Encoder mode. Indicates the current refresh rate of the web page.	
Audio Disabled	Visible in MPEG-2/4 mode. C-54 E-MC does not feature audio.	

10.1.3 PTZ camera control via your browser



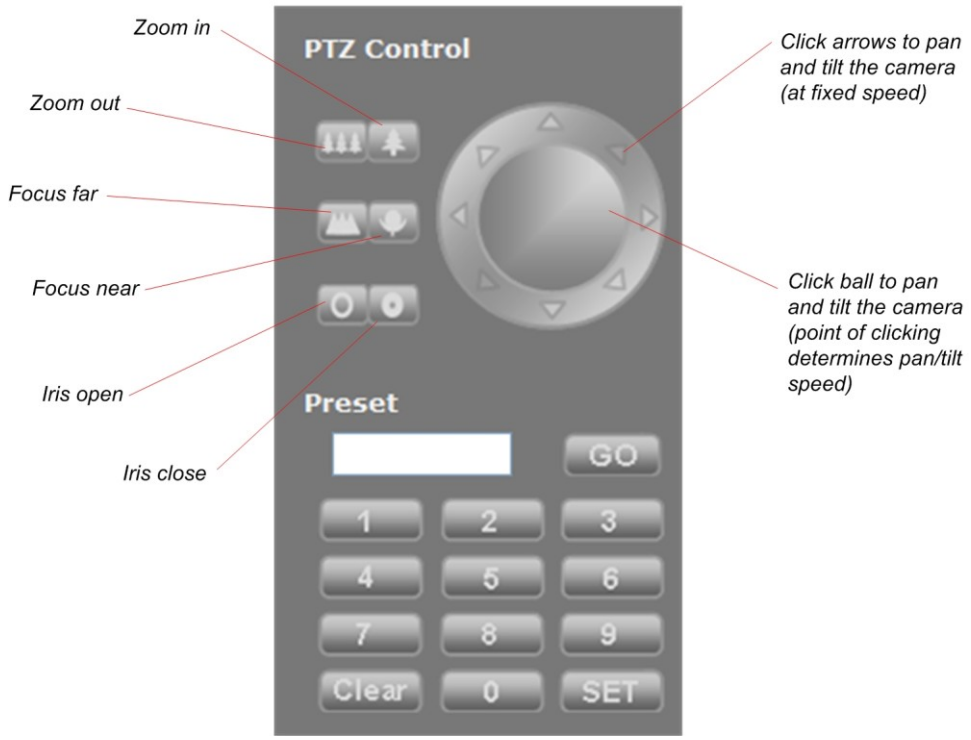
Live Video page with PTZ control panel

Displaying the PTZ control panel

With a PTZ driver selected on the PTZ web page, the PTZ control panel is visible to the right of the preview in maximized mode. If the selected driver is supported by the PTZ camera connected to the C-54 E-MC, you can use the panel to control the camera and manage the camera's presets. PTZ drivers not included in the driver list on the PTZ page can be uploaded to the C-54 E-MC via PTZ Driver Management on the same page.

Working with the PTZ control panel

Using the upper section of the PTZ control panel, you can pan, tilt, zoom, and focus the camera, and control the iris.



PTZ control panel

The Preset section is designed for working with preset camera positions.

To enter and save a preset camera position

1. Click the appropriate number button(s) to enter the preset number.
2. Adjust the camera's position for the desired view.
3. When satisfied with the position, click **SET**.

Note: The SET button is not available to users with Viewer rights.

To recall a preset camera position

1. Click the appropriate number button(s) to enter the preset number.
2. Click **GO**.

To erase a preset camera position

1. Call the preset.
2. Press **Clear**.
3. If desired, override the preset with a new preset position.

10.2 Status

Status
Status
Measurements
Video 1
Actual Video Standard PAL
Encoder 1, tx 1 state Ok
Encoder 1, tx 2 state Idle
Encoder 1, tx 3 state Idle
Encoder 2, tx 1 state Waiting
Encoder 2, tx 2 state Idle
Encoder 2, tx 3 state Idle
Live View, Enabled true
Encoder 1, RTSP connections 0
Encoder 2, RTSP connections 0

Status page: a snapshot with automatic page updating

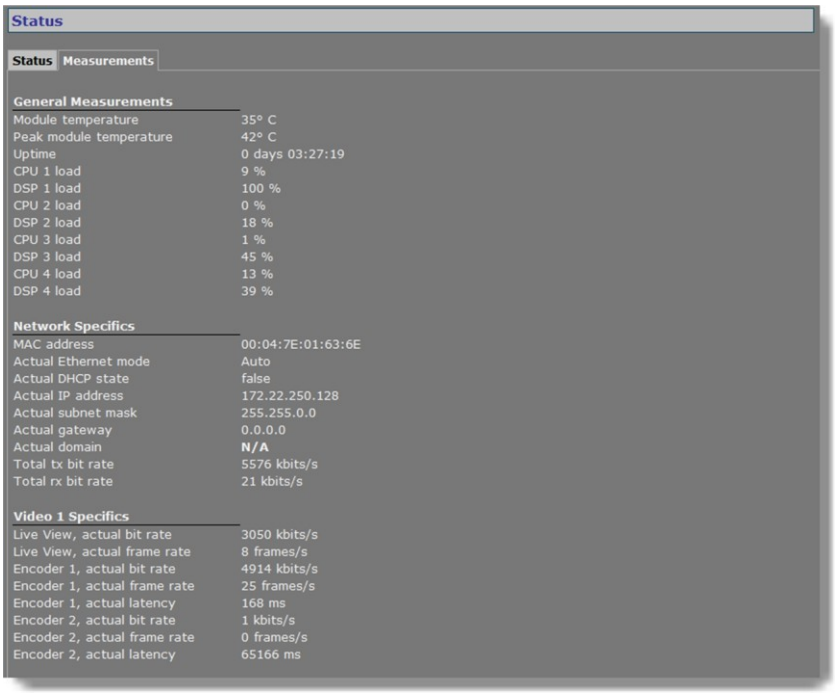
The Status page has two tabs: *Status* and *Measurements.*

10.2.1 Status tab

The Status tab provides information on the stream states of video streams. A stream state is reported as *Idle*, *Waiting*, or *OK*.

Stream state	
Ok	There is nothing wrong with the stream. If the video signal is removed from the video input on the encoder side, the Decoder rx state will still be reported as *Ok*, since the video transmitter will be sending a stream, that is - a *No Video* image - to the decoder.
Idle	The transmitter/receiver is not enabled.
Waiting	The transmitter/receiver has lost its stream connection. Possible causes: ▸ An incorrect port number. ▸ The transmitter on the encoder side is not enabled. ▸ No FloodGuard packets have been received for more than 3 seconds. For details on the FloodGuard flooding prevention mechanism, see the *note on FloodGuard* (on page 55).

10.2.2 Measurements tab

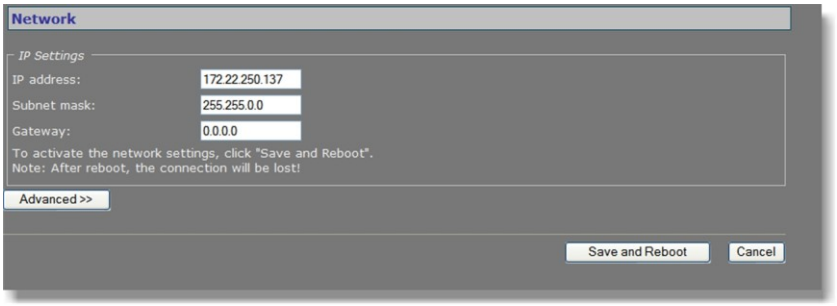

Status
Status
Measurements
General Measurements
Module temperature 35° C
Peak module temperature 42° C
Uptime 0 days 03:27:19
CPU 1 load 9 %
DSP 1 load 100 %
CPU 2 load 0 %
DSP 2 load 18 %
CPU 3 load 1 %
DSP 3 load 45 %
CPU 4 load 13 %
DSP 4 load 39 %
Network Specifics
MAC address 00:04:7E:01:63:6E
Actual Ethernet mode Auto
Actual DHCP state false
Actual IP address 172.22.250.128
Actual subnet mask 255.255.0.0
Actual gateway 0.0.0.0
Actual domain N/A
Total tx bit rate 5576 kbits/s
Total rx bit rate 21 kbits/s
Video 1 Specifics
Live View, actual bit rate 3050 kbits/s
Live View, actual frame rate 8 frames/s
Encoder 1, actual bit rate 4914 kbits/s
Encoder 1, actual frame rate 25 frames/s
Encoder 1, actual latency 168 ms
Encoder 2, actual bit rate 1 kbits/s
Encoder 2, actual frame rate 0 frames/s
Encoder 2, actual latency 65166 ms

Status page, Measurements tab: a snapshot with automatic page updating

Measurements

The Measurements tab shows module temperatures (current and peak), module uptime, network specifics, such as the MAC address and the actual IP address, the network load from this module, the load information per processor, and signal stream-specific details.

10.3 Network



Network page: default IP address and subnet mask changed to match local subnet settings

IP Settings

On the Network page, you can set the unit's IP address, subnet mask and gateway IP address. For correct functioning of the C-54 E-MC, it is vital to set its network addressing to be compatible with the subnet it is hooked into.

Note: The factory-set IP address of the unit is in the 10.x.x.x range with a subnet mask of 255.0.0.0. Achieving initial communication with the unit requires that the network adapter of the browsing PC is set to the factory default subnet of the C-54 E-MC; for details, see *Establishing a Network Connection* (on page 15). Having made the internal web pages accessible in this way, you can use the Network page to change the default network settings to the desired settings.

For IP address input to be valid, the unit's IP address:

- must be within the 1.0.0.1 – 223.255.255.254 range
- cannot start with 127 (reserved for loopback on local host)

Do not forget to *Save and Reboot* after changing IP settings.

Important: It is essential to set at least the IP address correctly and keep the value on record, otherwise management of the unit will require special software. Note that the subnet mask is also required.

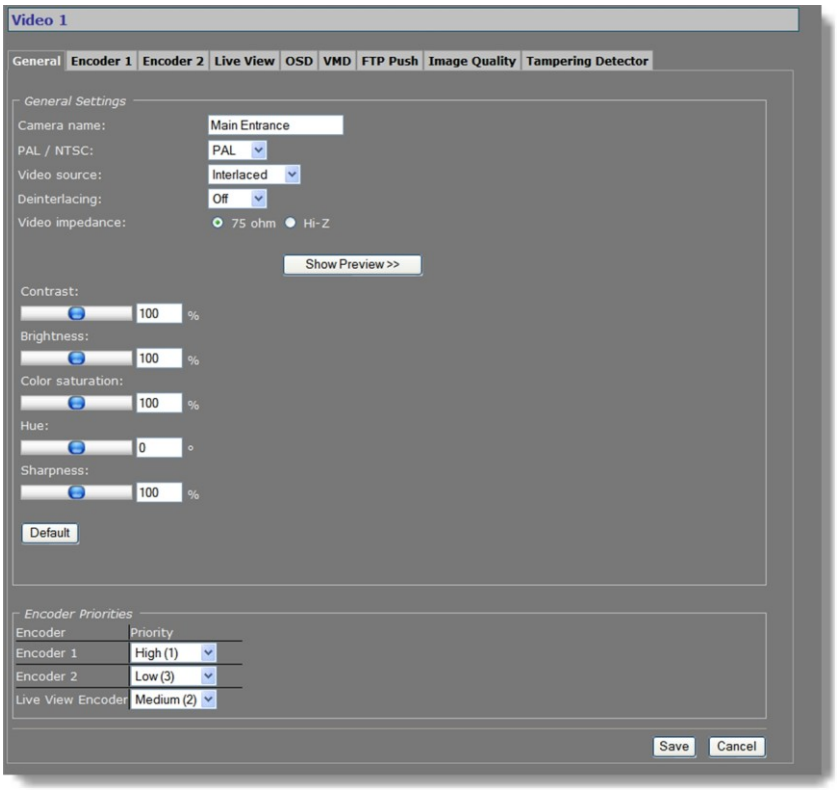
10.3.1 Advanced Settings

Network page, Advanced Settings

Pressing the **Advanced>>** button on the Network page gives you access to the following settings.

Network	
DHCP enable	Allows assigning of the IP address by a DHCP server instead of using static IP addressing.
Ethernet mode	Transmission mode and speed. ▸ *Auto* - Autonegotiation (default) ▸ *10 HDX* - Half duplex, 10 Mbit. ▸ *10 FDX* - Full duplex, 10 Mbit. ▸ *100 HDX* - Half duplex, 100 Mbit. ▸ *100 FDX* - Full duplex, 100 Mbit
IGMP unsolicited reports enable	Enables sending of unsolicited messages, such as requests to join a multicast group, for example, without having to wait for a query message from a management PC, multicast router or switch.

10.4 Video



Video 1 page

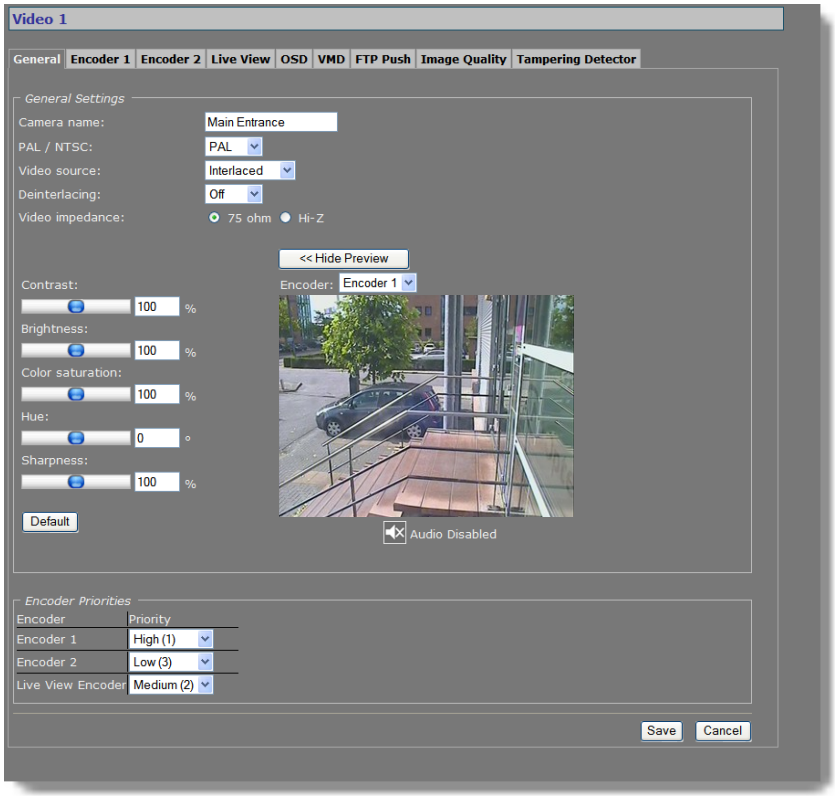
Note: The first time you open this page, you may encounter a security alert concerning the installation of a Java update. This add-on, required for proper display of the web pages, does not give rise to any security risks. You can install it safely.

Dual streaming per channel

Each of the four channels can transmit two streams at different resolutions and frame rates simultaneously. Selectable video formats are MPEG-2, MPEG-4, and MJPEG. A total of six copies per channel - three per independent stream - can be transmitted to different unicast and/or multicast destinations using Siqura's proprietary MX protocol. The C-54 E-MC supports source-specific multicast (SSM). Up to forty clients can retrieve streams using RTSP. It is also possible to use the Session Announcement Protocol (SAP) to transmit video streams to multicast destinations.

Per channel, the C-54 E-MC also has a Live View Encoder that can convert the analog video input signal to MJPEG format for streaming to web applications or remote devices using HTTP pull method. Via FTP Push, JPEG images can also be posted on an FTP server.

10.4.1 General tab



Video 1 page: General tab with Show Preview button pressed

Settings on the General tab apply to all encoders.

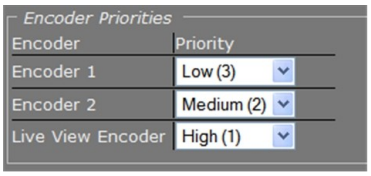
General Settings

Camera name	Enter a name to identify the camera. The following characters are not allowed in camera names: **! , ? ~ &**	
PAL / NTSC	*Auto*, *PAL*, or *NTSC*	The video display standard.
Video source	*Interlaced*	Interlaced scan, originating from traditional television systems, uses two fields to create a frame, one holding the odd lines in the image, the other holding the even ones. The two fields are captured at different moments. It is recommended to deinterlace (see below) interlaced video if you are planning to watch it on a progressive display, such as a computer monitor.
	Progressive	Progressive scan captures the entire image in one go. Images from progressive sources do not need deinterlacing, therefore. Selecting *Progressive* dims the *Deinterlacing* list.
Deinterlacing	*Off*	No deinterlacing performed.
	Linear	Siqura deinterlacing algorithm which preserves the resolution while at the same time filtering out motion artefacts (comb effects).
Video impedance	*75 Ohm* or *Hi-Z*. Resistance to flow of signal current. With one video source on one video input, select *75 Ohm*. With a number of video inputs in parallel using one video source, use *Hi-Z* on all inputs except the last.	

General Settings

Show Preview>>	Click to view live images and see the effect of the current settings.	
<<Hide Preview	Hiding the preview may improve web page responsiveness.	
Encoder	*Live View, Encoder 1*, *or Encoder 2*	List displayed after clicking the Show Preview>> button. Enables you to select a video encoder to handle the images seen in the preview.
Audio Disabled	Visible in Encoder 1 and 2 mode. C-54 E-MC does not feature audio.	
Contrast	Drag the sliding button, or enter values into the boxes, to adjust current settings, aided by the visual feedback from the preview. Settings entered here apply to all video encoders.	
Brightness		
Color saturation		
Hue		
Sharpness		
Default	Restores the original values.	

Encoder Priorities

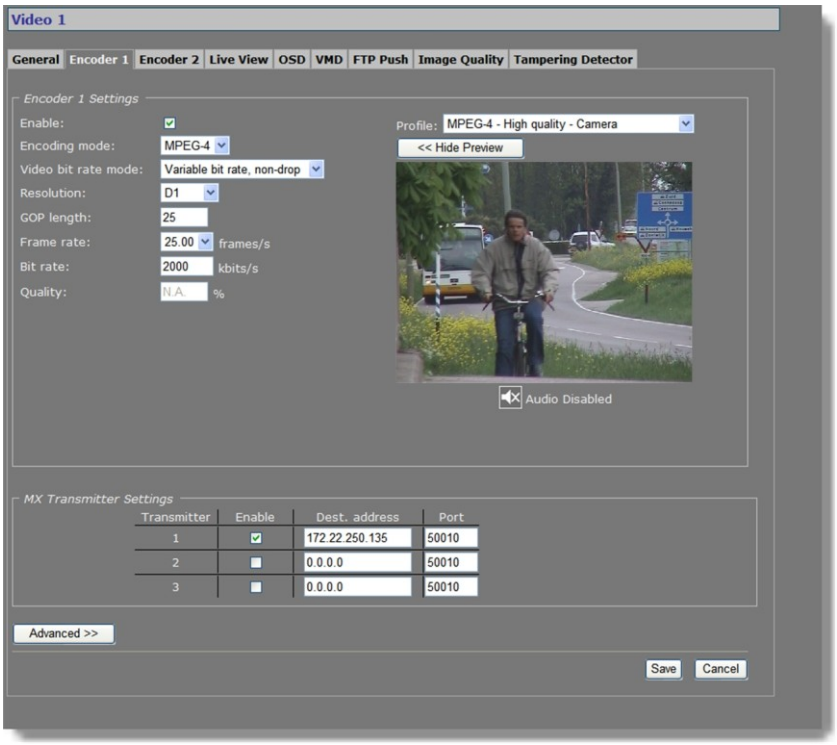


Priority list

Each priority on the Encoder Priority list can be assigned once. The encoder with High (1) priority consumes all CPU power it needs, leaving the remainder, if any, to the next in line. The encoder with Medium (2) priority will show the same behavior, possibly leaving little or no CPU power to the Low (3) priority encoder.

Important: To prevent Live View encoding (if used) from having the lowest priority, the highest priority is best assigned to the Live View encoder, since this is a relatively light task compared to the encoding tasks of Encoder 1 and Encoder 2.

10.4.2 Encoder # tab



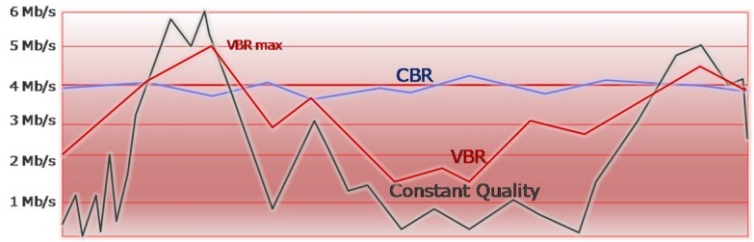
Video 1 page, Encoder 1 tab

Encoder # Settings

Enable	All encoders can be enabled and configured separately.	
Encoding mode	*MPEG-4*, *MPEG-2*, or *MJPEG*	The method used to compress the analog video input signal. The C-54 E-MC can stream (M)JPEG over UDP and HTTP. ▸ To enable and configure **UDP**/MJPEG streaming, select MJPEG from the Encoding mode list and configure settings. ▸ To transport JPEG over **HTTP** and/or to use the Live View previews in the web pages, go to the Live View tab, enable the Live View Encoder, and configure its settings.
Video bit rate mode	Controls variations in bit rates. For a concise explanation, consult the *note on Encoder Settings* (see "*Notes*" on page 42).	
	MPEG-4 encoding mode supports the following bit rate modes.	
	Constant quality	Keeps the image quality constant, with varying network load (from a few kb/s to 10 Mb/s or higher). The image quality is determined by the values set for the "Q min I" and "Q min P" parameters in the Advanced Settings section.
	Variable bit rate	Variable network load, but limited to value set for the *VBR maximum bit rate* parameter in the Advanced Settings section. The frame rate will suffer when the *VBR maximum bit rate* is reached.

Encoder # Settings

	Variable bit rate, non-drop	Variable network load, but limited to value set for the *VBR maximum bit rate* parameter in the Advanced Settings section. The quality will decrease when the *VBR maximum bit rate* is reached. The frame rate will be constant.
	Constant bit rate	Keeps network load constant at the cost of varying image quality. Frames may be skipped.
	Constant bit rate, non-drop	Keeps network load constant at the cost of varying image quality. Frames are never skipped.



MPEG-2 encoding mode supports the following bit rate mode.

Constant bit rate, non-drop	Keeps network load constant at the cost of varying image quality. Frames are never skipped.

MJPEG encoding mode supports the following bit rate modes.

Constant quality	Keeps the image quality constant, with varying network load (from a few kb/s to 10 Mb/s or higher). The quality is determined by the value set for the *Quality* parameter (see below).
Constant bit rate	Keeps network load constant at the cost of varying image quality. Frames may be skipped.

Resolution

The following resolutions are supported, see *Notes* (on page 42).

resolution (h x v)	PAL	NTSC
D1	720x576	720x480
2/3 D1	480x576	480x480
1/2 D1	352x576	352x480
2CIF	720x288	720x240
CIF (top field only)	352x288	352x240
QCIF	176x144	176x120

In addition, VGA (640x480) and QVGA (320x240) are also supported.

For more information on CIF resolutions, see *Notes* (on page 42).

Note: Per video input, the C-54 E-MC will simultaneously handle dual MPEG-2/4 encoding at full frame rate (MPEG-2 in I-frame only), and Live View encoding at 5 frames per second. Setting Encoders 1 and 2 to perform MPEG-2/4 encoding in D1 resolution at the same time may overtax the hardware. The unit's total output bandwidth, including streams controlled by RTSP, and those enabled through SAP, should not exceed 60 Mb/s.

GOP length	Available in MPEG-2/4 mode. Distance in frames between two I-frames.
Frame rate	Selectable rates are determined by the video mode (PAL, NTSC) set on the General tab. PAL: 1-25 fps; NTSC: 1-30 fps.

Encoder # Settings	
Bit rate	Range: [10…15000]. The speed of the digital transmission, that is - the amount of information transferred/processed per unit of time. Selecting a profile (see below), automatically sets the bit rate associated with the profile.
Quality	Available in MJPEG mode. Reflects the amount of compression. Generally speaking: the higher the quality setting, the lower the compression ratio and the more bits are consumed. This means a trade-off has to be found between the desired quality level and available bandwidth.
Profile	Preset combinations of settings for specific purposes. When a profile has been selected, changing one of its defined parameters sets the Profile box to '--', to indicate that a custom profile has been configured. When a freely chosen parameter value combination matches a preset profile, the name of the profile shows in the Profile box.
Show Preview>>	Click to view live images and see the effect of the current settings.
<<Hide Preview	Hiding the preview may improve web page responsiveness.
Audio disabled	Visible in Encoder 1 and 2 mode. C-54 E-MC does not feature audio.

Combinations of settings

Set sensible combinations of video bit rate mode, resolution, GOP length, and frame and bit rates. When setting and saving these values, you may notice that inappropriate value combinations are 'corrected' by automatic selection of the closest suitable combination. The output bit rate set may range from 10-15000 kbps. The total output bandwidth for the 4 video inputs should not exceed 60 Mb/s.

10.4.2.1 Notes

Note on CIF resolutions: CIF resolutions (2CIF, CIF, QCIF) use only one of the two frame fields. When CIF-encoded pictures are displayed on a monitor, the decoder simulates the second field (by extrapolation from the first field) in order to present two frame fields. CIF is mostly used for recording purposes, as a compromise between good video quality and storage capacity needed.

Note on Encoder Settings: Video bit rate mode can be set to be constant (i.e. the number of bits in a group of pictures) or variable. Selecting the correct mode for a given application, with emphasis on a good compromise between detail and good representation of frequent changes (motion), is generally vital.

Constant bit rate mode (CBR) is generally safest. Although the image quality may vary, the network load generated will remain fairly constant.
If constant picture quality is required and a varying network load will pose no problems, choose *Variable bit rate mode* (VBR). Video streaming is generally smoother under VBR.

Improving video picture quality and video stream quality, in terms of latency and smoothness for example, is subject to trade-offs. Many aspects of picture quality and stream quality are governed by a series of compression and signal parameters which may work favorably on one aspect while adversely affecting another.
For example, increasing the bit rate generally improves video quality, but also puts additional load on the network. But even for a given bit rate and network performance, video quality and streaming are influenced by other parameters and aspects. Please consult appropriate literature on video encoding formats, and application notes for clarification.

If in doubt about the effects of specific encoder settings, you are advised to select the profile offering the closest match to your required application.

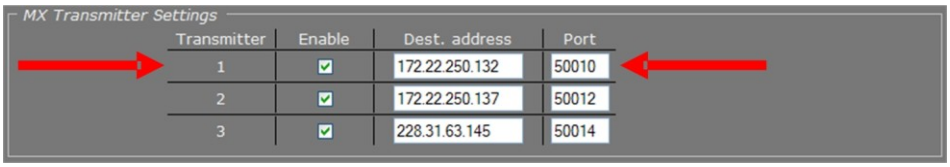
10.4.2.2 Making a Video Connection

Creating a video link between a video encoder and a decoder involves two steps:

- configuring the encoder's settings
- configuring the decoder's settings

To configure the encoder's settings

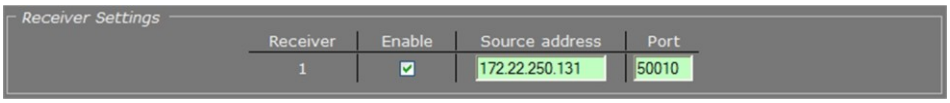
1. Open the encoder's web pages, go to the Video page, and select the appropriate Encoder tab.
2. In the Transmitter Settings section, specify the destination IP address.
   This is the address of the video decoder that will be receiving the video stream.
3. Enter the decoder's port number.
   For more information, see *Port Numbers* (on page 106).
4. Select **Enable**.
5. Press **Save**.



Video Transmitter Settings (encoder).
Transmitter 1 enabled, holding the decoder IP address and input port number.
An input port number must be used only once per device.

To configure the decoder's settings

1. Open the decoder's web pages, go to the Video page, and select the Decoder tab.
2. In the Receiver Settings section, specify the source IP address.
   This is the address of the video encoder that will be transmitting the video stream.
3. Enter the decoder's own port number.
   For more information, see *Port Numbers* (on page 106).
4. Select **Enable**.
5. Press **Save**.



Video Receiver Settings (decoder).
Receiver 1 enabled, holding the encoder IP address and the decoder input port number.
An input port number must be used only once per device.

With these settings configured correctly, the video link will be established. The decoder will take the video stream from the encoder, detect the video format and use the appropriate decoding algorithm to convert the stream to an analog output signal.

Note: Source and destination IP addresses can be unicast or multicast. For more information, see *Multicasting* (on page 105).

Highlighted fields

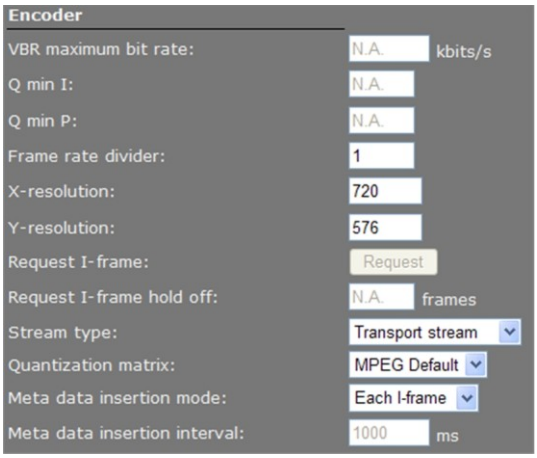
The source address and port number fields are highlighted in green when the enabled receiver receives a stream from the specified source. The two fields are marked in red when no stream is received with the receiver enabled and correctly configured.

10.4.2.3 Advanced Settings

Important: If in doubt about these settings, do not change the default values.

Encoder

Depending on the selected encoding mode, specific parameter values in this section are dimmed, that is - not available for configuration.



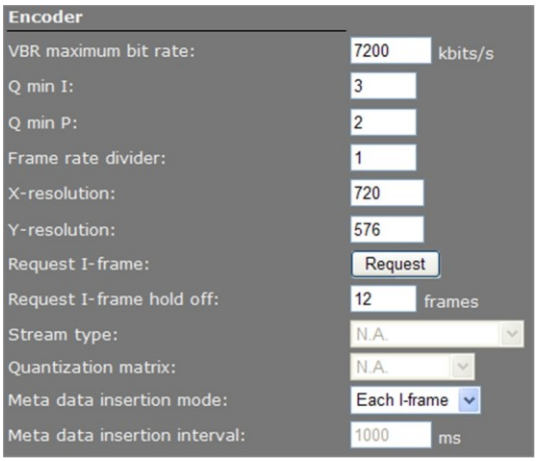
Advanced Settings, Encoder section, MPEG-2 mode

Encoder: MPEG-2 mode

Frame rate divider	Relates to the frame rate configured in the Encoder Settings section.	
X-resolution	Variables that enable you to freely set picture resolution instead of using the resolution presets in the Encoder # Settings section.	
Y-resolution		
Stream type	*Transport Stream* or *Elementary Stream*.	
Quantization matrix	*MPEG Default*, *Alternative 1*, or *Alternative 2*.	
Meta data insertion mode	For details, see the section on Meta Data Insertion.	
	Disabled	No meta data added to stream.
	Fixed interval	Activates *Meta data insertion interval* parameter (below).
	Each I-frame	Data block is added after each I-frame. The interval is determined by the GOP length, therefore.
Meta data insertion interval	Activate this parameter by setting *Meta data insertion mode* (above) to *Fixed interval*.	

Note on Quantization: Quantization is a lossy compression technique used in image processing. It is based on the fact that variations in high frequency brightness, for example, are not easily distinguished by the human eye. A quantization matrix, a combination of predefined values, is used to reduce the amount of information in the high frequency components of an image, thereby making the stream more compressible. The values in a quantization matrix are often chosen such that certain frequencies are kept in the source to avoid losing image quality.

Encoder

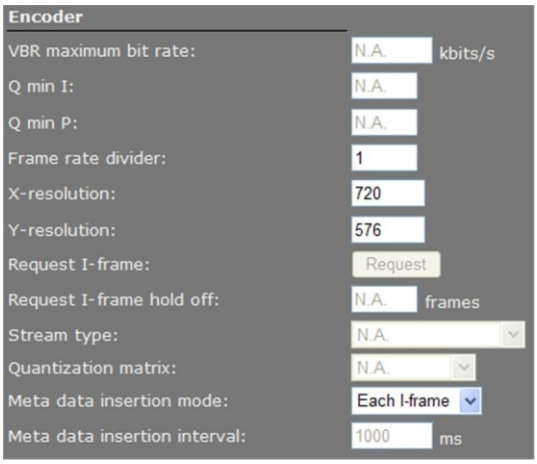


Advanced Settings, Encoder section, MPEG-4 mode

Encoder: MPEG-4 mode

VBR maximum bit rate	Range: [0...15000]. Sets a limit for variable bit rate.	
Q min I Q min P	Used to achieve consistent picture quality within a single GOP or across consecutive GOPs. Lower values produce a better picture, but require more processing. Default Q min I = 3; default Q min P = 2.	
Frame rate divider	Relates to the frame rate configured in the Encoder Settings section.	
X-resolution Y-resolution	Variables that enable you to freely set picture resolution instead of using the resolution presets in the Encoder # Settings section.	
Request I-frame	When joining a multicast stream in the middle of a long GOP, requesting an I-frame will speed up response time, i.e. image display will start sooner.	
Request I-frame hold off	Range: [0…255] frames. Requesting (too) many I-frames may add to latency. To prevent this, you can specify the distance in frames, starting after the previous I-frame, before another I frame is sent upon request.	
Meta data insertion mode	For details, see the section on Meta Data Insertion.	
	Disabled	No meta data added to stream.
	Fixed interval	Not supported for MPEG-4 streams. If a fixed interval is set, the nearest I-frame will be used.
	Each I-frame	Data block is added after each I-frame. The interval is determined by the GOP length, therefore.
Meta data insertion interval	Activate this parameter by setting *Meta data insertion mode* (above) to *Fixed interval*.	

Encoder

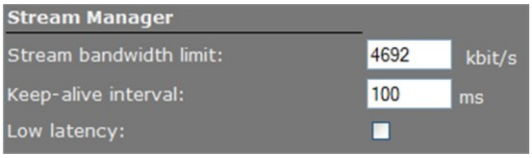


Advanced Settings, Encoder section, MJPEG mode

Encoder: MJPEG mode

Frame rate divider	Relates to the frame rate configured in the Encoder Settings section.
X-resolution	Variables that enable you to freely set picture resolution instead of using the resolution presets in the Encoder # Settings section.
Y-resolution	
Meta data insertion mode	Not supported for streaming MJPEG via Encoders 1 and 2.
Meta data insertion interval	

Stream Manager



Advanced Settings, Stream Manager Settings

Balancing network load

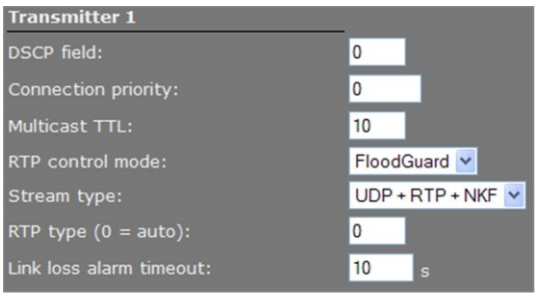
Peaks in the network load vary with encoder output. Use the Stream Manager to balance network load. It can limit the output rate per stream sent to the transmitters. Be warned that setting the Stream bandwidth limit to a lower value may introduce latency because peaks in the encoder output will be buffered.

Stream Manager

Stream bandwidth limit	Range: [0...100000] kbit/s. Sets the maximum bit rate per stream sent to the transmitters. This will serve to spread bursts but in its turn may give rise to latency, e.g. when handling large I-frames. You are advised to limit the outgoing bit rate per encoder to a maximum of 15Mbit/s. The total outgoing bit rate of Encoders 1/2 and the Live View Encoder, including RTSP controlled streams and SAP streams, should not exceed 15 Mit/s per channel. See the value for the Total tx bit rate parameter on the Measurements tab of the Status page. The Stream bandwidth limit mechanism is disabled when Low latency (see below) is selected. See also the graphic in the Note on FloodGuard later in this chapter.
Keep-alive interval	Range: [10 … 100000] milliseconds. The frequency for sending keep-alive messages to the encoder
Low latency	Raises the output bandwidth limit to allow for peaks in the network load. To be selected if you need to keep the delay between the input and output of images as short as possible, for improved tracking with a dome camera for example. Selecting *Low latency* disables the *Stream bandwidth limit* mechanism.

Note on Low Latency mode: This mode may cause packet loss in the network. In this mode, short bursts of 100 MB data may overflow the input buffer of an Ethernet aggregation switch. As a rule of thumb, the average load of an Ethernet port should not exceed 40% of its maximum load (i.e. 40 MB for a 100 MB port).

Transmitter

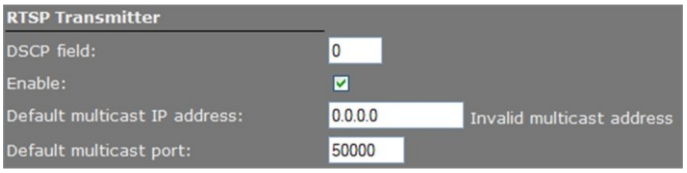


Advanced Settings, Transmitter #

Transmitter

DSCP field	Range: [0...63]. DSCP (Differentiated Services Code Point) uses the first 6 bits of the ToS (Type of Service) field in the header of IP packets for packet classification purposes. The bit pattern in the field indicates the type of service and forwarding behavior at the next node. With 26 bits, up to 64 network service types can be defined. *RFC 2724* (*http://www.ietf.org/rfc/rfc2474.txt*) describes the Differentiated Services (DS) field and the DiffServ Code Point. See also the note on Differentiated Services later in this chapter.	
Connection priority	Parameter intended for use with MX Software Development Kit (MX SDK).	
Multicast TTL	Range: [0...127]. Specify the number of routers (hops) that multicast traffic is permitted to pass through before expiring on the network.	
RTP control mode	Select the transport protocol to control the stream.	
	None	No transport protocol selected.
	FloodGuard	Flooding prevention mechanism. For more information, see the note on FloodGuard later in this chapter.
	RTCP	Real-Time Control Protocol, a network control protocol for use in communications systems to control streaming media servers.
Stream type	*UDP + RTP*	Default setting. Plain RTP stream over UDP.
	UDP + RTP + NKF	Adds an extended RTP header for Siqura applications requiring extra information.
RTP type (0 = auto)	Default value: [0]. This parameter determines the RTP payload format (e.g. H.264, MPEG-2/4, or audio). To avoid an RTP type conflict, the values specified on both sides of the connection must be the same. The default value of "0" automatically sets the appropriate media type. You are advised not to change this setting.	
Link loss alarm timeout	Range: [1...1000] s. Default: 10 s. Time in seconds before alarm sent.	

RTSP Transmitter

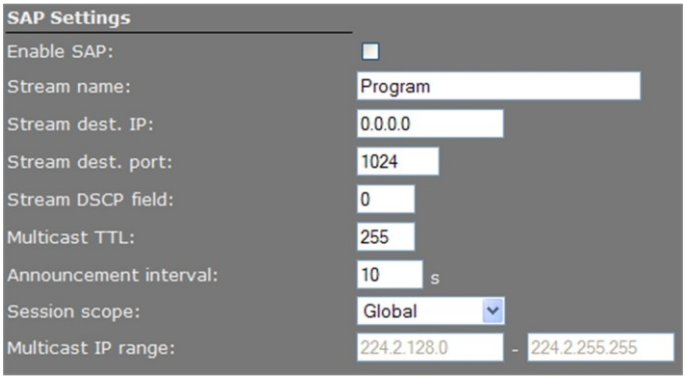


Advanced Settings, RTSP Transmitter

RTSP Transmitter

DSCP field	Range: [0...63]. DSCP (Differentiated Services Code Point) uses the first 6 bits of the ToS (Type of Service) field in the header of IP packets for packet classification purposes. The bit pattern in the field indicates the type of service and forwarding behavior at the next node. With 26 bits, up to 64 network service types can be defined. *RFC 2724* (*http://www.ietf.org/rfc/rfc2474.txt*) describes the Differentiated Services (DS) field and the DiffServ Code Point. See also the note on Differentiated Services later in this chapter.
Enable	Selecting this check box activates the Default multicast IP address text box. The RTSP transmitter itself does not require enabling.
Default multicast IP address	Select the *Enable* check box (see above) to activate this box. The "Invalid multicast address" warning disappears upon specification of a valid multicast address.
Default multicast port	Port number for multicast sessions.

SAP Settings



Advanced Settings, SAP Settings

SAP announcer

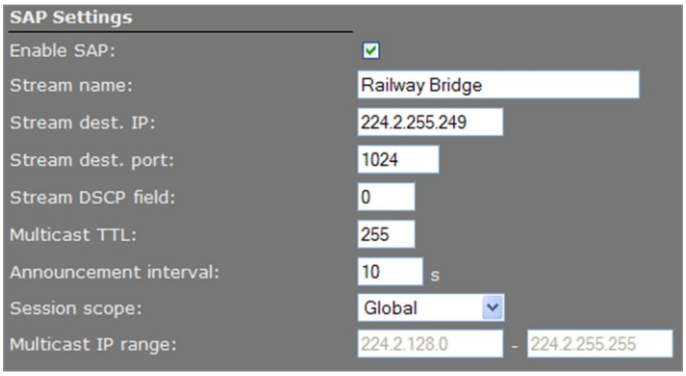
The C-54 E-MC includes a SAP announcer. The Session Announcement Protocol is used to advertise that a media stream generated by the C-54 E-MC is available at a specific multicast address and port. The C-54 E-MC can send SAP multicast streams for Encoder 1 and Encoder 2. For more information about SAP, see the note later in this chapter.

SAP Settings

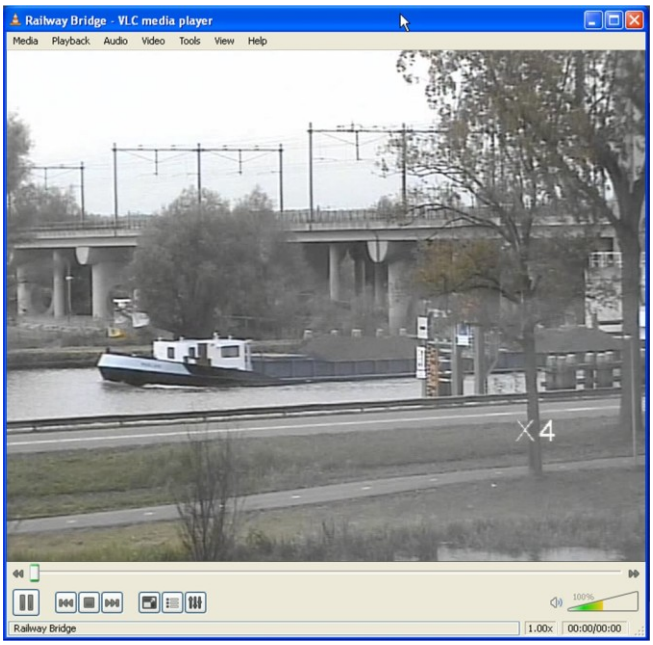
Enable SAP	When selected, session announcements are sent at the frequency determined by the Announcement interval parameter and the media stream is transmitted to the multicast IP address specified in the Stream dest. IP address box.
Stream name	Enter a descriptive name to identify the media stream.
Stream dest. IP	Enter the multicast IP address the media stream is to be sent to. The address must be within the range defined by the Multicast IP range parameter.
Stream dest. port	The destination port number. Default: 1024.
Stream DSCP field	Range: [0…63]. See the note on DSCP.
Multicast TTL	Range: [0...127]. Specify the number of routers (hops) that multicast traffic is permitted to pass through before expiring on the network.
Announcement interval	Determines the frequency of announcements.
Session scope	*Global*, the default session scope, sets the *Multicast IP range* parameter to 224.2.128.0 - 224.2.255.255 (IPv4 global scope sessions). A SAP listening application will recognize the global scope and automatically listen for SAP announcements at the 224.2.127.254 multicast IP address. The *Administrative* session scope allows you to enter a custom IP range within the 239.0.0.0 - 239.255.255.255 (IPv4 administrative scope sessions) range. For an Administrative session scope, the multicast address for SAP announcements will be set to the highest address in the relevant administrative scope. For example, for a scope range of 239.16.32.0 - 239.16.33.255, the IP address 239.16.33.255 is used for SAP announcements.
Multicast IP range	See Session scope.

To configure SAP settings, do the following

1. In the SAP settings section, select **Enable SAP**.
2. Enter a stream name.
3. In the Session scope list, select **Global** or **Administrative**.
4. If you selected *Administrative* in the previous step, specify the Multicast IP range.
5. Enter the Stream Destination IP address and the port number.
   The IP address must be within the scope range displayed for the Multicast IP range parameter.
6. Enter/modify the values for Stream DSCP field, Multicast TTL, and Announcement Interval, if desired.
7. Click **Save**.
   The video stream can now be viewed in a media player, such as QuickTime or VLC.



SAP example settings



C-54 E-MC SAP network stream opened via VLC Playlist

10.4.2.4 Meta data insertion

Enabling

All C-54 E-MC encoders can be configured to include meta data in the video streams they generate. The insertion of meta data is enabled by setting an interval via the Advanced Settings of the encoder. A meta data message is added to the stream as a block of data with a fixed format (see examples below). The messages contain product information to identify the source of the stream and all relevant status information related to the stream or codec.

Note: This section provides a general explanation of meta data insertion as implemented in Siqura products. The unit this manual pertains to, may or may not feature all of the media (e.g. audio, contact closure) and encoding formats included below.

Message layout

The layout of the product info message (always inserted) is as follows.

'O'	'P'	'T'	'C'	0x00	Prod. name (ASCII)	0x80	Serial number (ASCII)	0x80	Softw. version (ASCII)	0x80

For MPEG-2 and MPEG-4, Meta Data is preceded by the Meta Data header (00 00 01 B2):

0x00	0x00	0x01	0xB2	Meta Data message

For MJPEG, these (for the rest identical) messages will be inserted as comment field (FF FE):

0xFF	0xFE	Size (MSB)	Size (LSB)	Meta Data message

For H.264, these (for the rest identical) messages will be inserted as SEI NAL-unit (0x06), marked as type Meta Data Unregistered (0x05):

0x06	0x05	Size	UUID (16 bytes)	Meta Data message

This message contains all relevant status messages, related to the video stream or codec. The data ID is 0x01, with the message in the following layout.

'O'	'P'	'T'	'C'	0x01	Status1	Status2	Status3	Status4	(future expansion possible)

Status 1	Video status
Bit 0 (lsb)	Video loss on input
Bit 1	Black/white video
Bit 2	VMD alarm
Bit 3	Tampering alarm
Bit 4	Image quality alarm
Bit 5	(for future use, will be '0')
Bit 6	(for future use, will be '0')
Bit 7 (msb)	Fixed '0'

Status 2	General status
Bit 0	Temperature alarm
Bit 1	(for future use, will be '0')
Bit 2	(for future use, will be '0')
Bit 3	(for future use, will be '0')
Bit 4	(for future use, will be '0')
Bit 5	Audio present
Bit 6	Fixed '1'
Bit 7	Fixed '0'

Status 3	CC status (part 1)
Bit 0	Ccin-1
Bit 1	Ccin-2
Bit 2	Ccin-3
Bit 3	Ccin-4
Bit 4	Ccin-5
Bit 5	Ccin-6
Bit 6	Ccin-7
Bit 7	Fixed '0'

Status 4	CC status (part 2)
Bit 0	Ccin-8
Bit 1	(for future use, will be '0')
Bit 2	(for future use, will be '0')
Bit 3	(for future use, will be '0')
Bit 4	(for future use, will be '0')
Bit 5	(for future use, will be '0')
Bit 6	Fixed '1'
Bit 7	Fixed '0'

10.4.2.5 Notes

Note on Differentiated Services: Differentiated Services (DiffServ, or DS) is a method for adding QoS (Quality of Service) to IP networks. In routed networks, critical network traffic such as video and audio streams, which require a relatively uninterrupted flow of data, can get blocked due to other traffic. DiffServ can be used to classify network traffic and give precedence - i.e. low-latency, guaranteed service - to high-priority traffic, while offering best-effort service to non-critical traffic such as file transfers or web traffic.
Each stream has a DSCP (Differentiated Services Code Point) field in the IP header. Routers will identify the network service type in the DSCP field and provide the appropriate level of service. Low-latency service can be realized, for example, through priority queuing, bandwidth allocation, or by assigning dedicated routes.

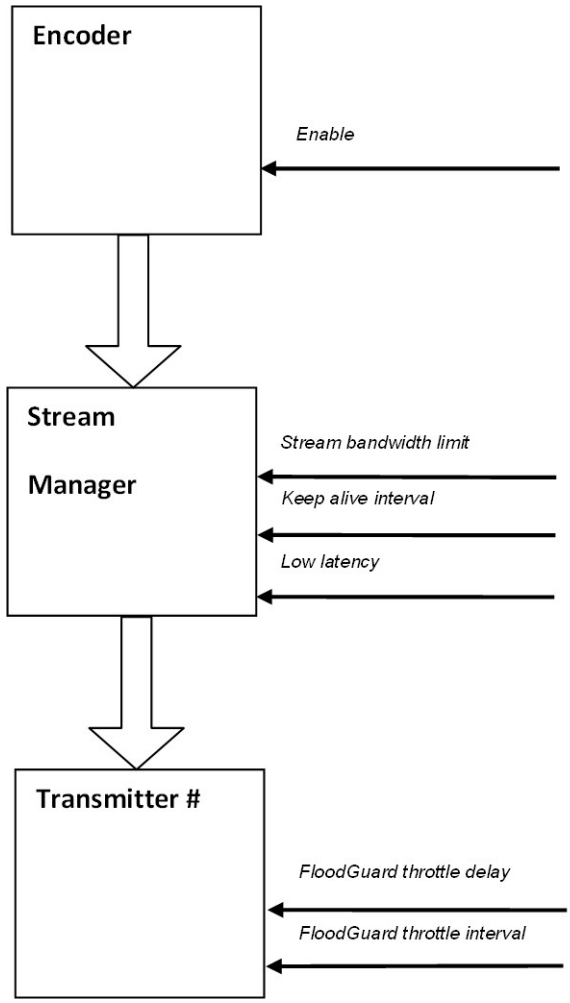
Note on RTP and RTCP: The Real-time Transport Protocol (RTP) is designed for end-to-end real-time, audio or video data flow transport. It is regarded as the primary standard for video/audio transport over multicast or unicast network services. RTP does not provide guaranteed delivery, but sequencing of the data makes it possible to detect missing packets. It allows the recipient to compensate for breaks in sequence that may occur during the transfer on an IP network. Error concealment can make the loss of packets unnoticeable.
RTP is usually used in conjunction with the Real-time Transport Control Protocol (RTCP). RTP carries the media streams. RTCP provides reception quality feedback, participant identification and synchronization between media streams.

Note on the Session Announcement Protocol (SAP): SAP, defined in *RFC 2974* (see RFC 2974 - *http://www.ietf.org/rfc/rfc2974.txt*), is a protocol for advertising multicast session information. A SAP announcer periodically broadcasts announcement packets which include the session description information of multicast sessions presented by the announcer. SAP uses the Session Description Protocol (SDP) as the format of the session descriptions. The announcement is multicast with the same scope as the session it is announcing, ensuring that the recipients of the announcement are within the scope of the session the announcement describes. SAP listening applications can listen to the announcements and use the information to construct a guide of all advertised sessions. This guide can be used to select and start a particular session. The SAP announcer is not aware of the presence or absence of SAP listeners.

Note on FloodGuard: FloodGuard is a Siqura™ proprietary stream control mechanism that can be enabled/disabled independently for each video and sampled data transmitter. FloodGuard throttles the transmitter when it no longer receives control messages from the receiver, thereby preventing the transmitter from flooding the network.

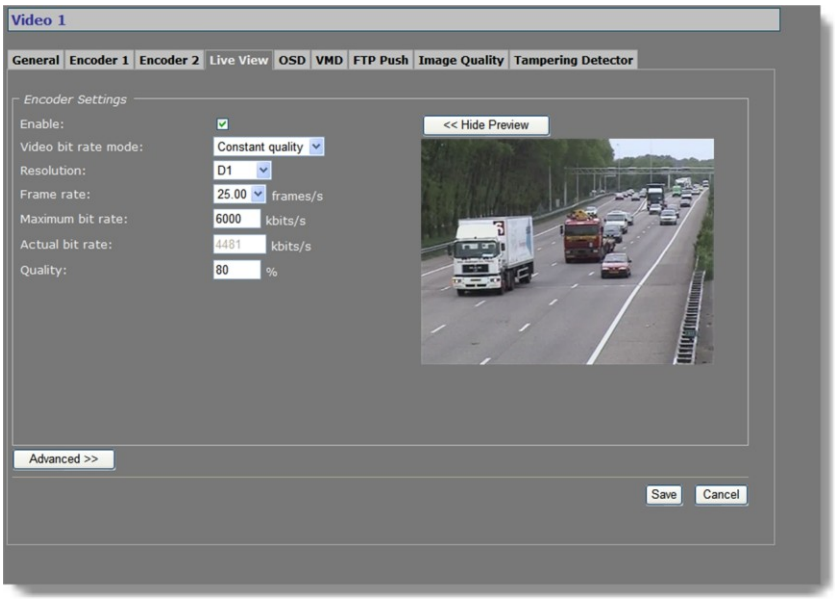
FloodGuard only works when enabled on both the transmitter and the receiver, and when the transmitter sends to a unicast address.

When a transmitter is enabled, it opens a control receive port with the port number equal to its source port number + 1. This port listens for control packets from the destination receiver. When no FloodGuard packets come in during the time set for the *FloodGuard throttle delay*, the receiver is expected to have disappeared (powered off, receiver disabled, network problem, etc.) and the stream is 'throttled'. In throttled mode the transmitter - in order to contact the intended receiver (again) - sends empty packets into the network at an interval determined by the *FloodGuard throttle interval* parameter. After reception of a valid FloodGuard packet the transmitter immediately resumes streaming.



Stream Manager and FloodGuard

10.4.3 Live View tab



Video page, Live View tab

(M)JPEG output

The C-54 E-MC provides multiple (M)JPEG output methods.

- To transport JPEG over **HTTP** and/or to use the Live View previews in the web pages, enable the Live View encoder and configure its settings.
- To enable and configure **UDP**/MJPEG streaming, go to the Encoder 1/2 tab, select MJPEG encoding mode and configure settings.
- To activate the uploading of JPEG images to an FTP server, configure the required settings on the FTP Push tab and the Event Management page.

Encoder Settings

Enable	All encoders can be enabled and configured separately.	
Video bit rate mode	Controls variations in bit rates.	
	Constant quality	Keeps the image quality constant, with varying network load. The quality is determined by the value set for the *Quality* parameter (see below).
	Constant bit rate	Keeps network load constant at the cost of varying image quality. Frames may be skipped.
Resolution	Set sensible combinations of mode, resolution, frame rate and (maximum) bit rate. It is advised to limit MJPEG encoding to 5 fps when the C-54 E-MC is also handling MPEG-2/4 encoding with 1xD1 and 1xCIF or 2CIF at full frame rate.	
Frame rate		
(Maximum) bit rate		
Actual bit rate	Available in Constant quality mode (CQM). This field is dynamically updated with the current bit rate to provide feedback on the bit rate that is used on average with the current Quality setting (see below).	
Quality	Available in Constant quality mode CQM). Reflects the amount of compression. Generally speaking: the higher the quality setting, the lower the compression ratio and the more bits are consumed. This means a trade-off has to be found between the desired quality level and available bandwidth.	

Encoder Settings

Show Preview>>	Click to view live images and see the effect of the current settings.
<<Hide Preview	Hiding the preview may improve web page responsiveness.

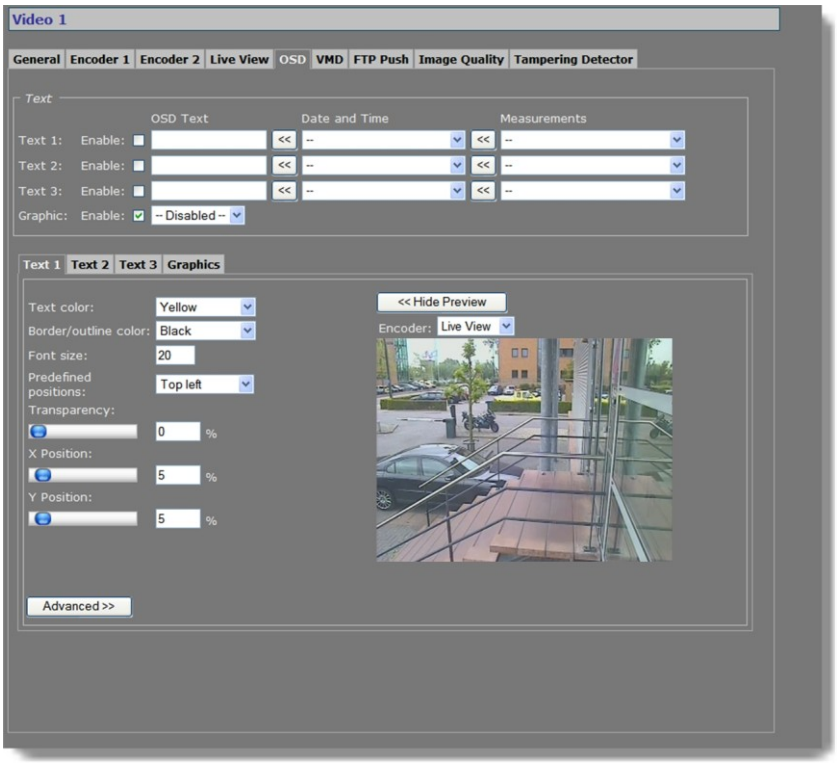
10.4.3.1 Advanced Settings

Live View tab, Advanced Settings

Advanced Settings

Frame rate divider	Relates to the frame rate configured in the Encoder Settings section.	
X-resolution Y-resolution	Variables that enable you to freely set picture resolution instead of using the resolution presets in the Encoder # Settings section.	
Meta data insertion mode	Determines the method used to add meta data to the stream. For details, see the section on Meta Data Insertion.	
	Disabled	No meta data added to the stream.
	Fixed interval	Activates *Meta data insertion interval* parameter (below).
	Each frame	Data block is added after each frame.
Meta data insertion interval	Range: [100-10000] ms. Sets the (fixed) interval at which meta data is added to the stream. Activate this parameter by setting *Meta data insertion mode* (see above) to *Fixed interval*.	

10.4.4 OSD tab



Video 1 page, OSD tab

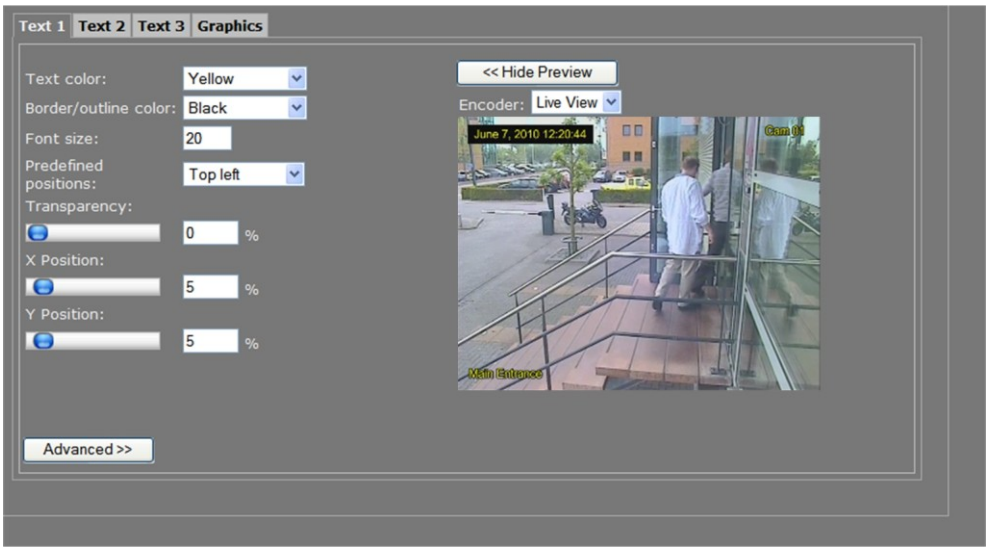
OSD facilities

The C-54 E-MC features programmable on-screen display (OSD) facilities. One graphic and up to three OSD text bars can be displayed, each of which can be independently configured. Visual feedback is provided in the preview.

Text

Enable	All OSD objects can be enabled and configured separately. To (temporarily) remove a bar or graphic from the screen, clear the Enable check box.
OSD text	The text to be displayed. Maximum: 255 characters. Text is displayed in a single line. The number of characters visible on screen is determined by the font size and the space offered by the screen line.
Date and Time	Select a format from the list and click the Append button to add the information to the OSD text box.
Measurements	Select a measurement from the list and click the Append button to add the information to the OSD text box.
Graphic	Graphics that have been uploaded to the module (see Graphics tab, Advanced settings) can be selected from the list and enabled.

10.4.4.1 Text tab

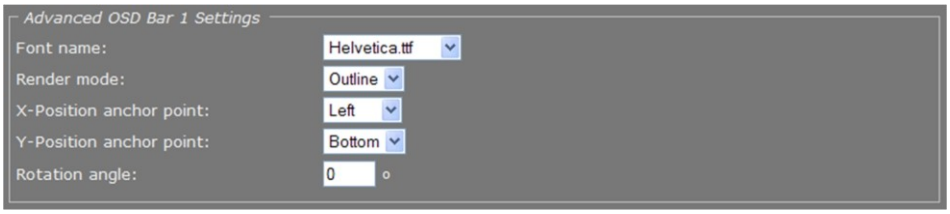


Text 1 tab with 3 OSD bars in the preview.
Render modes 'Border' (top left) and 'Outline' (top right & bottom left).

Text # tab

Text color	Changes made here and in the other fields are immediately written into the device and reflected in the preview.
Border/outline color	
Font size	Range: [0...256].
Predefined positions	Presets for positioning the OSD object.
Transparency	Drag the sliding button or enter a percentage.
X Position	Variables that enable you to freely position the object, instead of using the presets. Drag the sliding buttons or enter a percentage. When a preset has been selected, changing one of its defined parameters sets the *Predefined positions* box to '--', indicating that a custom position has been configured.
Y Position	
Show Preview>>	Click to view live images and see the effect of the current settings.
<<Hide Preview	Hiding the preview may improve web page responsiveness.
Encoder	The encoder handling the images seen in the preview.

Advanced Settings



Advanced OSD Bar # Settings

Advanced OSD Bar # Settings

Font name	Offers a selection from default and uploaded fonts (see Font Management).
Render mode	*Outline* or *Border*.
X-Position anchor point	Variables that enable you to shift the OSD object relative to the anchor point.
Y-Position anchor point	
Rotation angle	Background size automatically adjusts to text dimensions when a bar is rotated.

Font Management

Text # tab: Font Management settings

For OSD texts, you can use the C-54 E-MC's default fonts or fonts you upload to the unit.

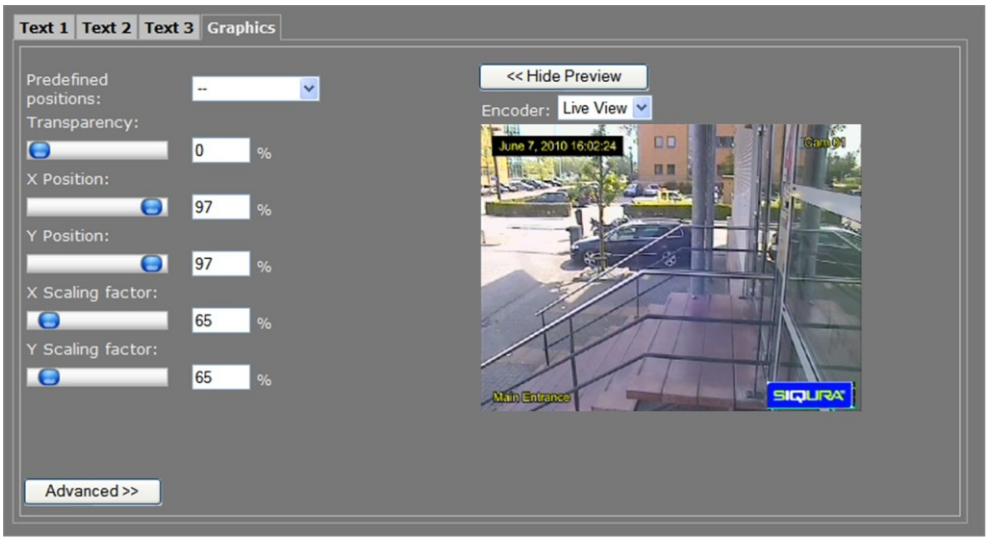
To upload a font

1. In the Font management section, click **Browse**.
   The Open dialog box displays.
2. Browse to the folder containing the font to be uploaded.
3. Select the correct file (.ttf extension), and then click **Open**.
   The file appears in the File text box on the web page.
4. To start the upload, click **Add**.
   The new font is added to the Font list and to the Font name list in the Advanced OSD Bar # Settings section.

To remove a font

1. In the Font management section, select the font.
2. Click the **Del** button.

10.4.4.2 Graphics tab



Graphics tab with 3 OSD bars and a graphic (bottom right) in the preview

The Graphics tab enables you to manage graphics (see below), and scale and position a selected graphic on your screen.

Graphics tab

Predefined positions	Presets for positioning the OSD object.
Transparency	Drag the sliding button or enter a percentage.
X-Position	Variables that enable you to freely position the object, instead of using the presets. Drag the sliding buttons or enter a percentage. When a preset has been selected, changing one of its defined parameters sets the *Predefined positions* box to '--', indicating that a custom position has been configured.
Y-Position	
X Scaling factor	Variables that enable you to freely configure the dimensions of the object.
Y Scaling factor	
Show Preview>>	Click to view live images and see the effect of the current settings.
<<Hide Preview	Hiding the preview may improve web page responsiveness.
Encoder	The encoder handling the images seen in the preview.

Advanced Settings

Graphics tab: Advanced Picture Settings

Advanced Picture Settings

X-Position anchor point	Variables that enable you to shift the OSD object relative to the anchor point.
Y-Position anchor point	
Animation speed scaling factor	Enables you to set the speed for an animated GIF graphic.

Graphic Management

Graphics tab: Graphic Management

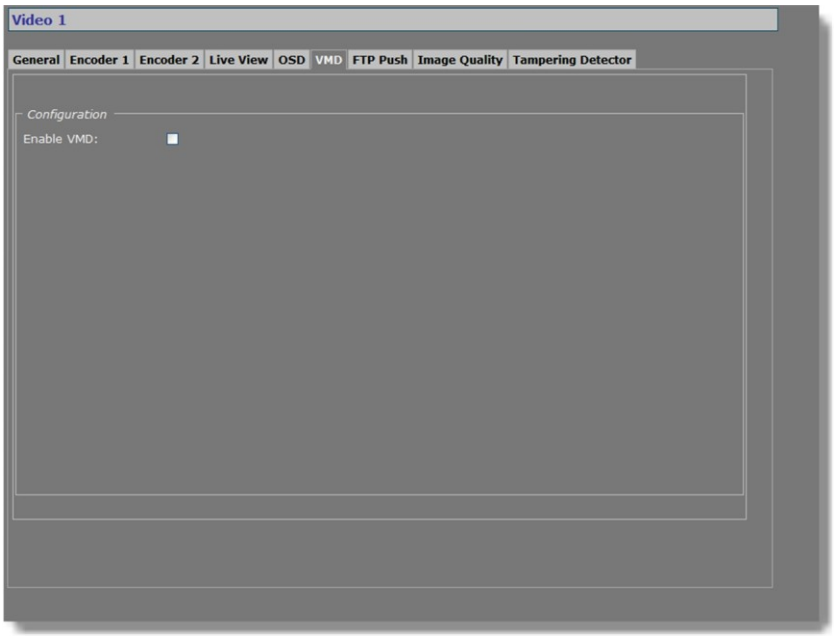
To upload a graphic

1. In the *Graphic Management* section, click **Browse**.
   The *Open* dialog box displays.
2. Browse to the folder containing the graphic to be uploaded.
3. Select a file with the correct file extension (.bmp, .gif, .jpg, jpeg), and then click **Open**.
   The file appears in the *File* textbox.
4. To start the upload, click **Add**.
   The graphic is added to the graphics list and to the *Graphic* drop-down list in the *Text* section.

To remove a graphic

1. In the *Graphic Management* section, select the graphic.
2. Click **Del**.

10.4.5 VMD tab



VMD tab, Video Motion Detection disabled

Video Motion Detection

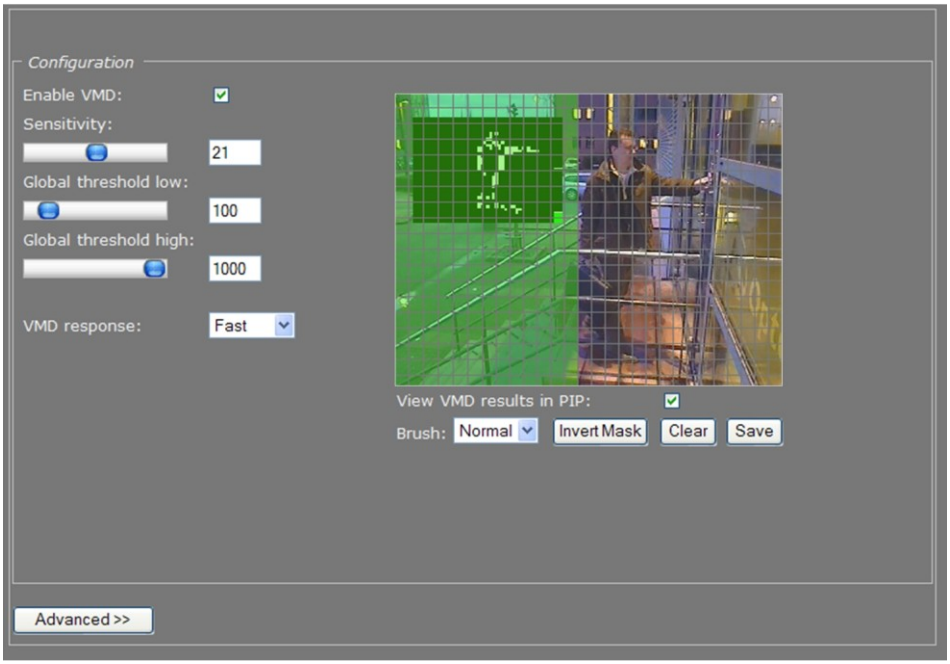
Video Motion Detection (VMD) enables the user to define a portion or portions of the screen and to detect picture changes there; these changes could be caused by motion or varying lighting, for instance. Regions of less interest can be masked.

10.4.5.1 VMD startup

To start Video Motion Detection

1. On the Video page, click the **VMD** tab.
2. Select **Enable VMD** to activate the detection process.
   Depending on the current VMD settings, a VMD alarm will be generated on changes in the picture.

10.4.5.2 VMD Configuration 1: Detection Parameters



VMD enabled: Configuration section with controls, video picture, and motion detection inset, the latter with mask applied. The mask permits motion detection in the right half of the picture only, at the top of the stairs, so passers-by and cars would not be registered by the detector facility; neither will the details in the background (the trees are reflected in the window pane though, and this could be masked separately).

Configuration

Enable VMD	Select this box to expand the Configuration section, as shown in the above figure.
Sensitivity	This setting relates to local detection levels: local change is only detected if its level exceeds a certain value. The sensitivity setting can be used to eliminate unwanted ('false') triggering (e.g. caused by background noise or constant local movement).
Global threshold low	These settings relate to the summed amount of change within fully or partly unmasked portion(s) of the screen; a value between the two thresholds gives rise to a corresponding VMD alarm. The level of this alarm can be set (A-N) using separate Siqura software.
Global threshold high	
VMD response	*Fast* or *Filtered*. Filtering is used to suppress a single peak as false triggering.

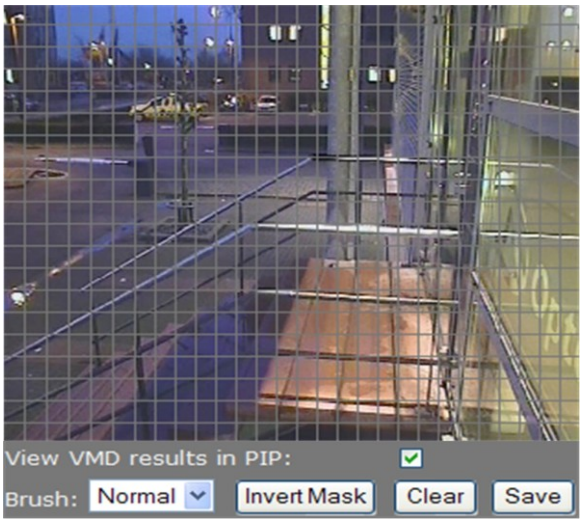
10.4.5.3 VMD Configuration 2: Setting the mask

To set a mask

- To edit the mask, click on the grid that is put over the image.
  One or more mask elements at, and possibly around, that position, are produced.
- Hold the standard mouse button and drag, to 'brush' (i.e. mask) larger areas, with a 'Normal', 'Small', or 'Large' brush.
- Use the 'Invert Mask' button to reverse a selection.
- Hold the right mouse button and drag, to erase mask areas.
- Use the 'Save' button to store the mask in the unit.

To delete a mask

- Press the **Clear** button.



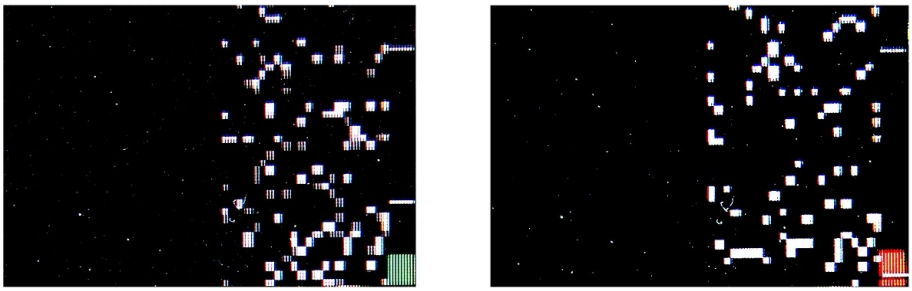
Masking grid

Configuration

Brush	*Normal*	Allows grid elements to be accessed in 4-element groups.
	Large	Allows grid elements to be accessed in 16-element groups.
	Small	Allows grid elements to be accessed one at a time.
Invert Mask	Enables you, for example, to start creating a mask by marking the (smaller) area(s) you *do* wish to monitor and then use this button to reverse the selection.	
View VMD results in PIP	Inserts the Video Motion Detection inset providing feedback on current VMD settings.	
Clear	Clears the mask.	
Save	Makes the current mask effective and stores it for later use.	

10.4.5.4 VMD detection window

The VMD detection window shows up as a small picture within the larger picture. Depending on the thresholds set, the motion detection bar on the right side of the picture shows up green or red (see figures below), the latter indicating a VMD alarm will be generated. In the pictures, the upper and lower thresholds are shown as two white markers. If the bar runs over the highest marker, it will turn green again and there will be no alarm condition.

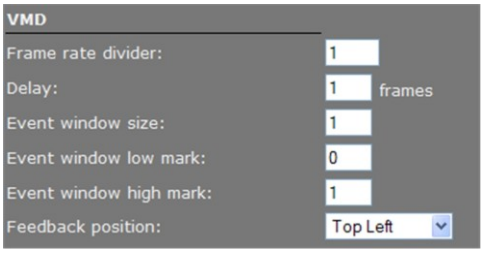


VMD detection windows, with mask applied to the left half of the window. The small white blocks indicate grid elements where change occurred above the sensitivity level. The summed change is reflected in the bars on the right, the green one (left) not reaching the lower threshold. The red one (right picture) extending past it, since this threshold is set much lower.

10.4.5.5 VMD alarm

If movement is detected, a module alarm (VMD) will be generated and sent out over the network using the (unsolicited) notification mechanism. Such alarms can be caught using appropriate software.

10.4.5.6 Advanced Settings

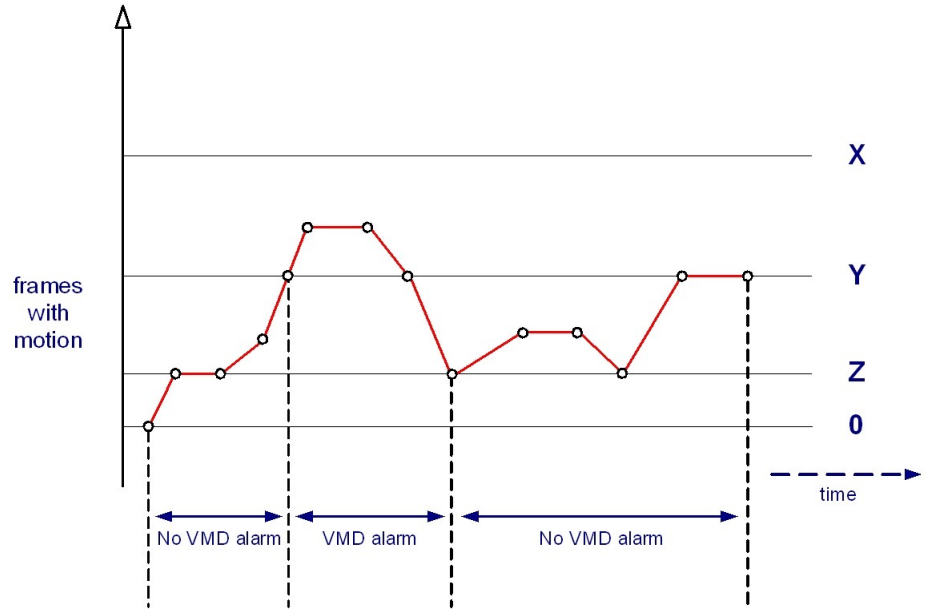


VMD: Advanced Settings

VMD	
Frame rate divider	Range: [1...100]. Used to determine the number of frames used for VMD. Only 1 divided by this value frames are evaluated.
Delay	Range: [1...10] frames. The delay in frames between the currently processed frame and the stored frame with which it is to be compared.
Event window size	Range: [1…32]. Number of frames evaluated at a time to determine if there is a VMD alarm.
Event window low mark	Range: [0…31]. Thresholds determining if there is a VMD alarm.
Event window high mark	
Feedback position	Enables you to position the detection window (not to be confused with an event window).

Note on Advanced VMD Settings: Motion is detected by comparing the current frame with a reference image (e.g. a previous frame) and calculating the difference between the two. The value you enter for the *Event window size* parameter determines how many frames are evaluated for VMD purposes at a time. Not all frames from the original video stream are used for VMD. Only *1 divided by the value set for the frame rate divider* frames are evaluated.

A VMD event becomes active when, within the Event window, the number of frames with motion exceeds a configurable value, the *Event window high mark*. After this, the VMD event will remain active until the number of frames with motion drops below another configurable value, the *Event window low mark*.

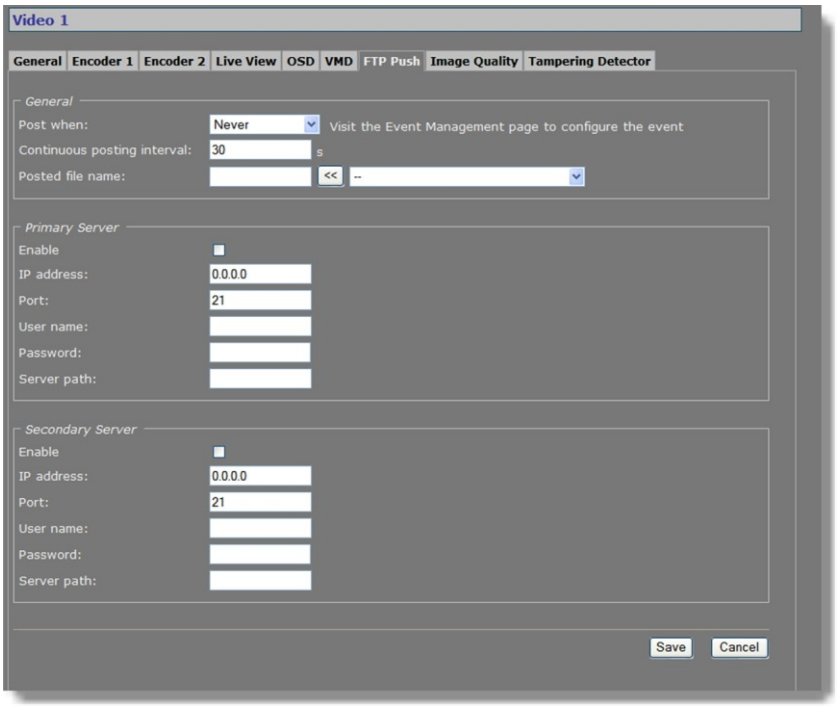


VMD Alarm: Event window high/low mark

X = Event window size
Y = Event window high mark
Z = Event window low mark

VMD alarm becomes active when in at least Y out of X frames motion is detected.
VMD alarm becomes inactive when in at least Z out of X frames *no* motion is detected.

10.4.6 FTP Push tab



Video 1 page, FTP Push tab

JPEG image posting

The C-54 E-MC can be configured to upload images, generated by its Live View encoder, to an FTP server. Posting the files in JPEG format can be set to be continuous or event-triggered. On the Event Management page, one or more events can be associated with FTP Push.

General

Post when	*Never*	No image posting
	Event On	Image is posted when configured event occurs.
	Event Off	Image is posted when configured event ceases.
	Event Changed	Images are posted when configured event occurs or ceases.
	Continuous	Posting not associated with any event. Images are sent continuously at the frequency set for the *Continuous posting interval* parameter.
Continuous posting interval	Range: [1-300] s. Applies to continuous posting only. Determines the frequency of image posts.	
Posted file name	Enter a descriptive name. Use the Append list and button (<<) to include extra information to identify the files. The "$", "#", and "@" symbols described below can also be typed directly after the name.	

General

Append list	Options to add information and file extension to the file name entered.	
	<UTC-Time/date>.jpg	Time/date. Appended as "_$.jpg".
	<SeqNr>.jpg	Sequence number. Appended as "_#.jpg".
	<SeqNr>_<UTC-Time/date>.jpg	Sequence number and time/date. Appended as "_#_$.jpg".
	<SeqNr>_<Event State>.jpg	Sequence number and event state. Appended as "_#_@.jpg". Examples of event state: T=true, F=false.
	<UTC-Time/date>_<Event State>.jpg	Time/date and event state. Appended as "_$_@.jpg".

FTP server

A target FTP server must hold a user account associated with the C-54 E-MC. You can assign a primary server and a secondary server. Images are posted simultaneously to both the primary server and secondary server.

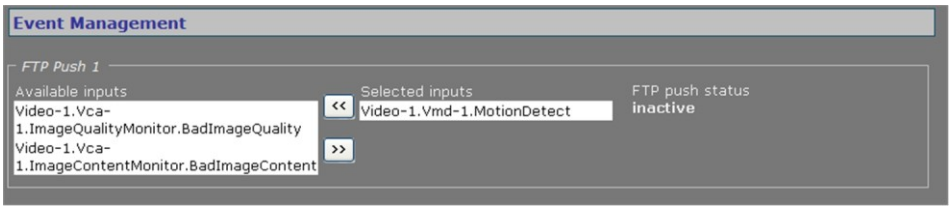
FTP Push, Primary Server, example settings

Primary/Secondary Server

Enable	Select or clear to respectively enable/disable the connection with this server.
IP address	IP address of the FTP server.
Port	The FTP protocol typically uses port 21 on the FTP server to listen for clients initiating a connection. Port 21 is also where the server is listening for commands issued to it.
User name	The authorization to access the FTP server.
Password	
Server path	Folder on the FTP server assigned to the FTP client. To be used, for example, if the client is not allowed to access the server root folder.

Event Management

Having selected *Event On*, *Event Off*, or *Event Changed* as a trigger, do not forget to go to the Event Management page to associate one or more events with the FTP push.



Event Management page: FTP Push 1 section. One input associated with FTP push.

Monitoring and troubleshooting FTP push

You can monitor FTP push on the Measurements tab of the Status page. Measurements on this tab are continuously updated. In the FTP Push section, you can compare the number of incoming triggers with the number of succeeded posts.

FTP Push 1	
Nr of incoming triggers	23
Nr of succeeded posts, server 1	22
Last post status, server 1	OK
Nr of succeeded posts, server 2	0
Last post status, server 2	**N/A**

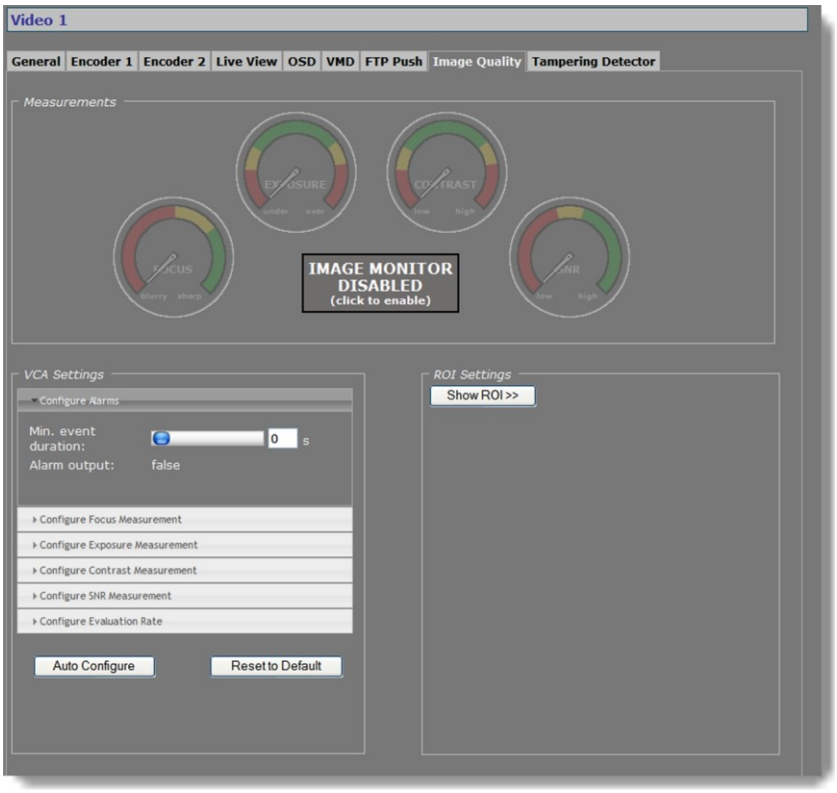
Status page, Measurements tab: FTP Push 1 section

If you need to troubleshoot the file upload process, the messages reporting the last post status will in most cases point you to possible causes of problems.

FTP Push 1	
Nr of incoming triggers	154
Nr of succeeded posts, server 1	0
Last post status, server 1	ftpput: unexpected server response to STOR: 550 Filename invalid
Nr of succeeded posts, server 2	0
Last post status, server 2	**N/A**

Last post status: example of error message

10.4.7 Image Quality tab



Video 1 page: Image Quality tab

Image Quality Monitor

The Image Quality Monitor can detect if images produced by a camera connected to a C-54 E-MC video input are still usable. It can give an indication of the performance of the camera and show whether or not it needs attention. A quality check is made against what is normally a good picture.

Examples of detectable occurrences

- The camera is in focus during sunny days, but out of focus in low light situations.
- The initial daytime camera position seemed ok, but streetlights and spot lights affect the image during nighttime.
- The lens has got dirty.
- The iris control has got stuck.
- Camera failure.

10.4.7.1 Enabling the Image Quality Monitor

The Image Quality Monitor can measure camera focus, exposure, contrast level, and SNR (Signal-to-Noise Ratio). The four measurements are disabled by default (see the figure above). You can enable them simultaneously or separately.

Note: Enabling/disabling a measurement also enables/disables the associated alarm.

To enable all measurements simultaneously

- In the *Measurements* section, click the **IMAGE MONITOR DISABLED** button.
  The four dials are activated, the pointers indicating the current measurements.

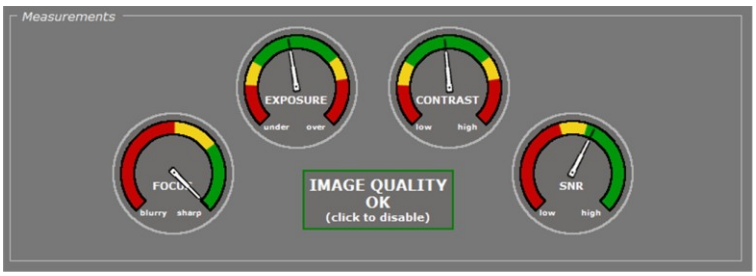


Image Quality: all measurements enabled

To enable/disable individual measurements separately

1. In the VCA Settings section, click the button labelled with the measurement you require.
   The settings of the selected measurement display.
2. Select/Clear the **Enable** box to enable or disable the measurement, respectively.

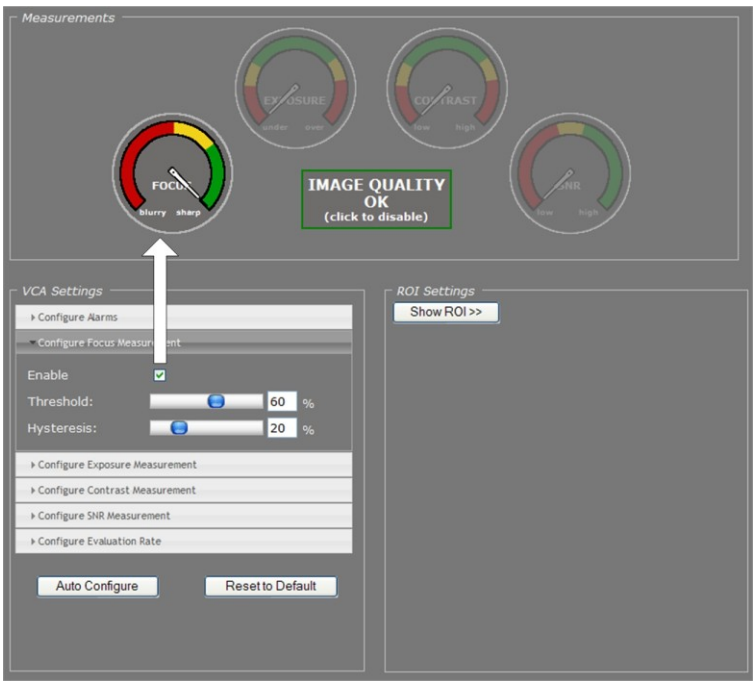
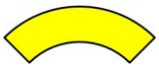


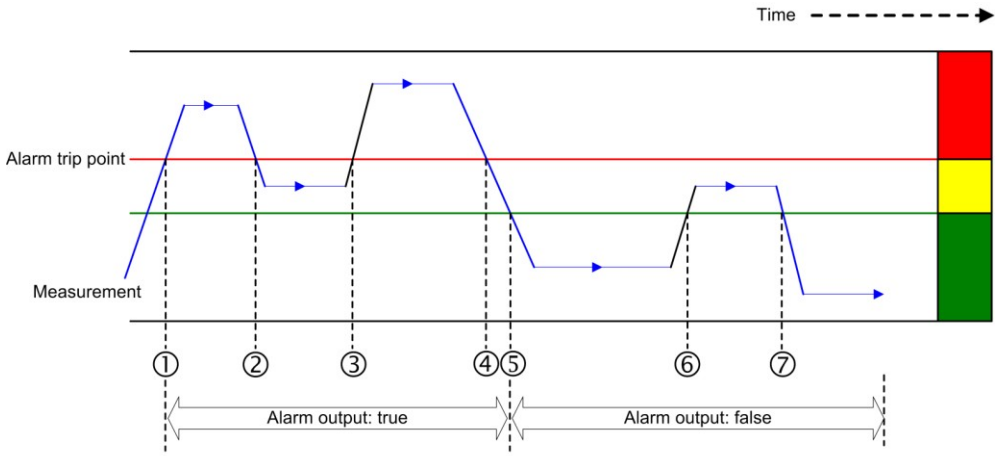
Image Quality: FOCUS measurement enabled only

10.4.7.2 Dial legend

The colored dials in the Measurements section provide a quick and easy glance at the health of the camera. You can fine-tune each measurement's alarm thresholds to your needs in the VCA Settings section.

Dial legend

	Error state.
	Hysteresis: the area where the alarm output is either "true" or "false" depending on the preceding alarm state, as illustrated in the figure below.
	Correct camera performance.



Hysteresis and alarm output

1. The Measurement rises above the trip point. After expiry of the delay set for the Min. event duration, the alarm is activated.
2. The Measurement drops into the Hysteresis area (i.e. the margin between incorrect and correct performance) but falls short of the "safe" area. The alarm is continued.
3. The Measurement re-enters the Error state area. The alarm continues.
4. The Measurements drops into the Hysteresis area. The alarm continues.
5. Camera performance is correct. The alarm is deactivated after expiry of the *Min. event duration*.
6. The Measurement rises into the Hysteresis area. The alarm trip point is not reached. Alarm output remains "false".
7. Camera performance is correct. Alarm output remains "false".

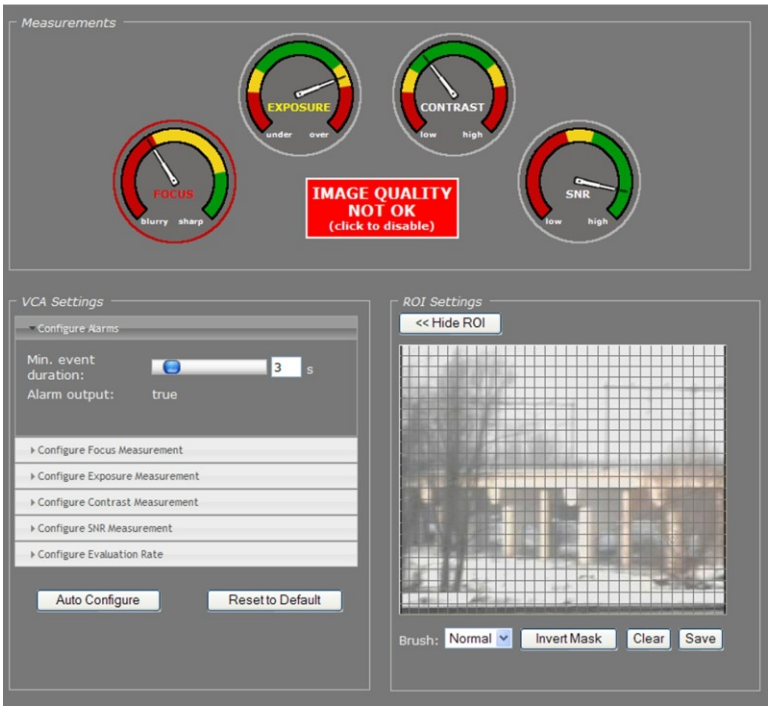


Image Quality not OK: Alarm output = true

The red circle around the Focus dial in the figure above indicates that the alarm is raised by the Focus measurement. The Exposure dial has no red circle, although the pointer is in the Hysteresis area. This shows that Exposure was correct before and that this measurement in itself is not the cause of the alarm.

Note: In addition to the visual indications on the web pages, alarms can also be read from the C-54 E-MC 's internal Management Information Base (MIB) using appropriate software.

10.4.7.3 Measurements configuration

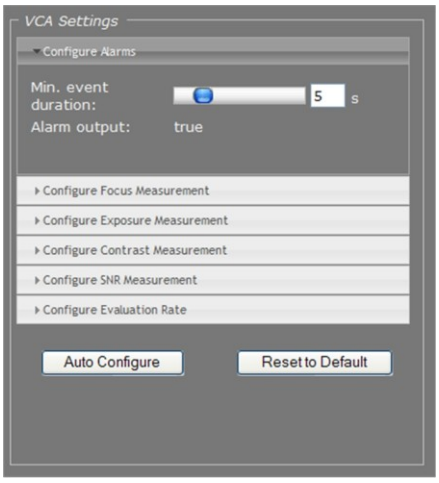


Image Quality: VCA Settings

The default Measurements values will mostly work well for you. If you do need to modify them you can do so in the VCA Settings section.

VCA Settings

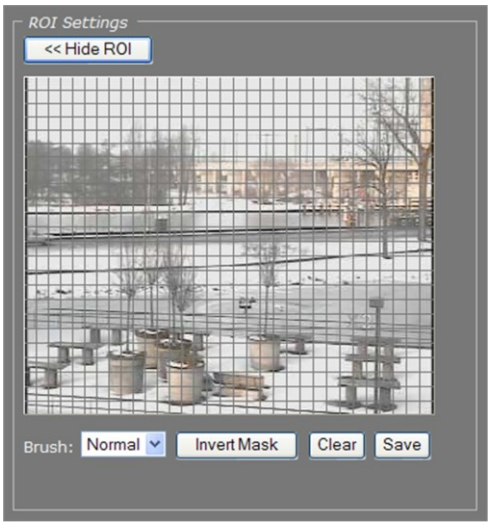
Configure Alarms	*Min. event duration*	Alarm output delay time: the time span that is to elapse before a continued change in conditions actually activates/deactivates the alarm output.
	Alarm output	*True* or *False*. Indication of current status.
Configure Focus Measurement	Allow you to enable/disable each measurement separately and customize its alarm threshold and hysteresis to your requirements.	
Configure Exposure Measurement		
Configure Contrast Measurement		
Configure SNR Measurement		
Configure Evaluation Rate	The value entered here determines the speed at which the host machine processes the algorithms underlying the measurements. Higher values take up more CPU power.	
Auto Configure	Adjusts the alarm thresholds, based upon the current measurements. The green area is centered around the current pointer position.	
Reset to Default	Restores the original thresholds. Does not affect the current activity status of the measurements (i.e. being Enabled or Disabled).	

Tip: A PTZ camera moving from one preset to the next may trigger an alarm if the scene change takes too long. Setting an appropriate time for the Min. event duration parameter can delay the alarm output until the camera has adopted the new position and the alarm condition has ceased.

To configure a measurement

1. In the *VCA Settings* section, click the button for the measurement you wish to configure. The measurement's settings display.
2. Select the **Enable** box, if necessary.
3. Set the alarm threshold to your requirements.
   Note that you can set two thresholds for *Exposure* (under- and overexposure) and *Contrast* (low and high contrast).
4. Set the Hysteresis.
5. Click the **Configure Alarms** button and set the *Min. event duration*, if desired.
6. Click the **Configure Evaluation Rate** button and modify this setting, if desired.

10.4.7.4 Region of Interest (ROI)



Region of Interest (ROI)

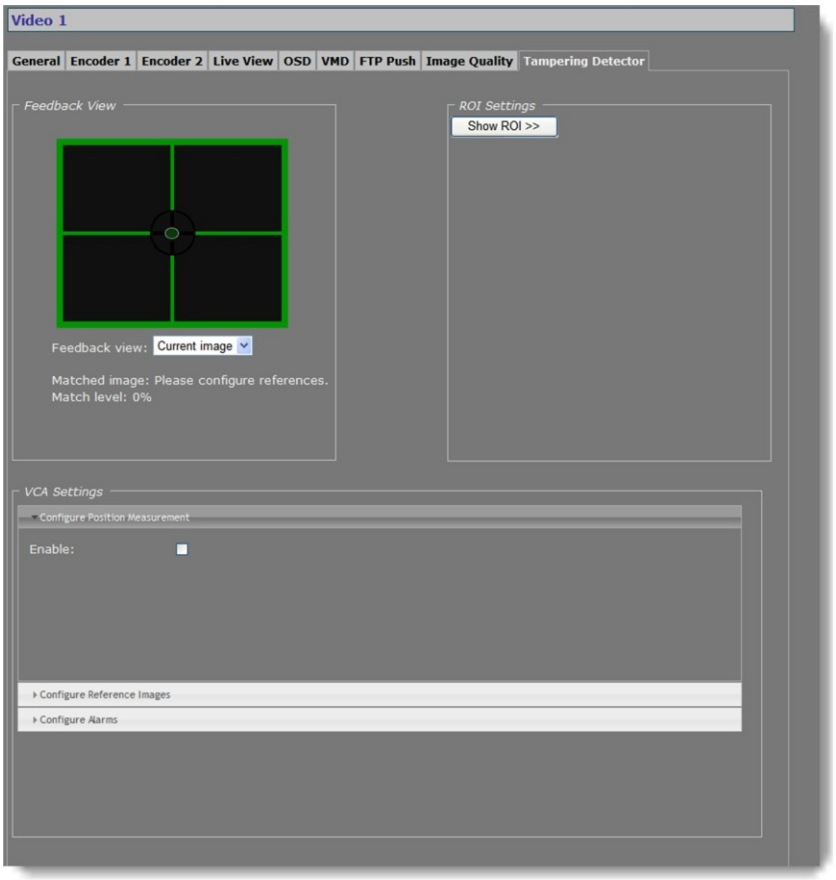
Pressing the Show ROI>> button in the ROI Settings section opens a preview with a grid overlay. You can use it to mask portions of the image you wish to exclude from monitoring. Certain regions can disrupt the measurements or be of no importance. You may want to filter out a bright source of light, a region with low contrast, or differences in focus, for example. The part of the image that you have *not* selected on creating the mask is called the Region of Interest (ROI).

- **To set a mask**
  - To edit the mask, click on the grid that is put over the image.
    One or more mask elements at, and possibly around, that position, are produced.
  - Hold the standard mouse button and drag, to 'brush' (i.e. mask) larger areas, with a 'Normal', 'Small', or 'Large' brush.
  - Use the 'Invert Mask' button to reverse a selection.
  - Hold the right mouse button and drag, to erase mask areas.
  - Use the 'Save' button to store the mask in the unit.
- **To delete a mask**
  - Press the **Clear** button.

Configuration

Brush	*Normal*	Allows grid elements to be accessed in 4-element groups.
	Large	Allows grid elements to be accessed in 16-element groups.
	Small	Allows grid elements to be accessed one at a time.
Invert Mask	Enables you, for example, to start creating a mask by marking the (smaller) area(s) you *do* wish to monitor and then use this button to reverse the selection.	
Clear	Clears the mask.	
Save	Makes the current mask effective and stores it for later use.	

10.4.8 Tampering Detector tab



Video 1 page: Tampering Detector disabled by default

Detection of position and scene changes

As a result of tampering, or more accidentally, after cleaning, a camera may no longer cover the area designated for monitoring. The C-54 E-MC's Tampering Detector function can detect camera position changes and scene changes such as a blocked camera view, for example. It does so by comparing the current image to one or more reference images that were captured and stored earlier.

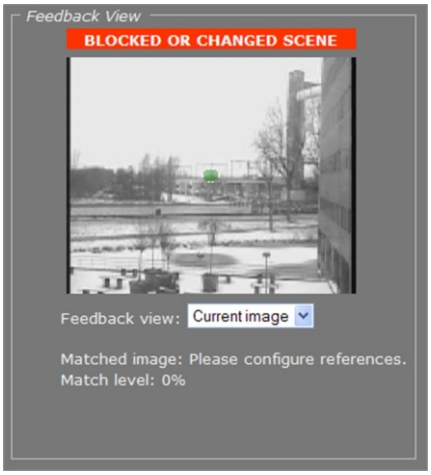
10.4.8.1 Enabling the Tampering Detector

The Tampering Detector functionality is disabled by default.

To enable the Tampering Detector

- In the *VCA Settings* section, select the **Enable** box.
  The Position Measurement settings are opened.

Important: If no reference images have been stored yet, a BLOCKED OR CHANGED SCENE alarm displays in the Feedback View. The Tampering Detector cannot find a match with the current image. You will need to create one or more reference images first.



Tampering Detector enabled: No reference images found

10.4.8.2 Reference images

You can create up to 16 reference images. This enables you to store images captured in different day/night situations and/or from multiple PTZ preset positions. When the camera moves to a different preset the Tampering Detector will try to match the new scene to the available reference images.

To create a reference image

1. In the VCA Settings section, click **Configure Reference Images**.
2. Open the **Reference image** list and select the image you want to create.
3. Enter a descriptive name in the *Label* box.
4. Enter a value (in seconds) for the *Sampling duratio*n.
   This parameter enables you to capture the background of a scene only and have specific elements such as moving objects filtered out of the image. With a longer time span for the sampling duration, persons passing in front of the camera, for example, or cars driving on a highway can be smoothed out to prevent them from triggering a changed scene alarm.
5. Click the **Sample reference** button.
   The current image is sampled.

Reference Image 1 created

You can use the ROI settings section to exclude portions of the image from monitoring, as explained in *Region of Interest* (on page 76).

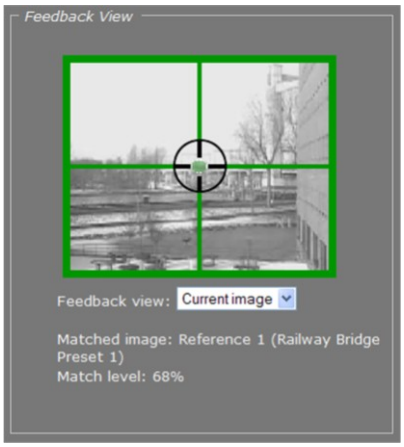
Region of less interest masked

Matching images

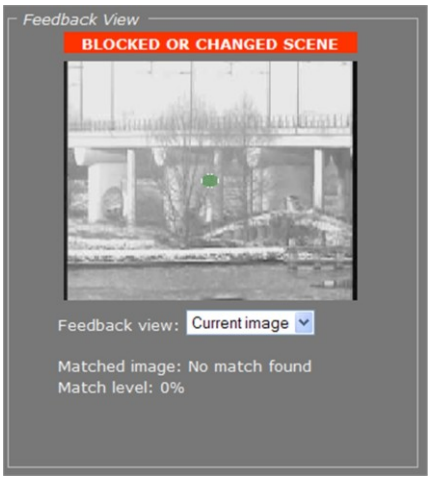
The Tampering Detector compares the current scene with all available reference images. If a match is found a green crosshair is superimposed on the image in the Feedback view. Information about the matched image and the match level is displayed under the Feedback view.

The small green circle in the middle of the image indicates the amount of camera movement that is allowed. A position alarm is raised when the green circle is outside the crosshair center. For information about adjusting the amount of allowed camera movement, see *Position Measurement* (on page 81).

If no match is found a BLOCKED OR CHANGED SCENE alarm is raised.

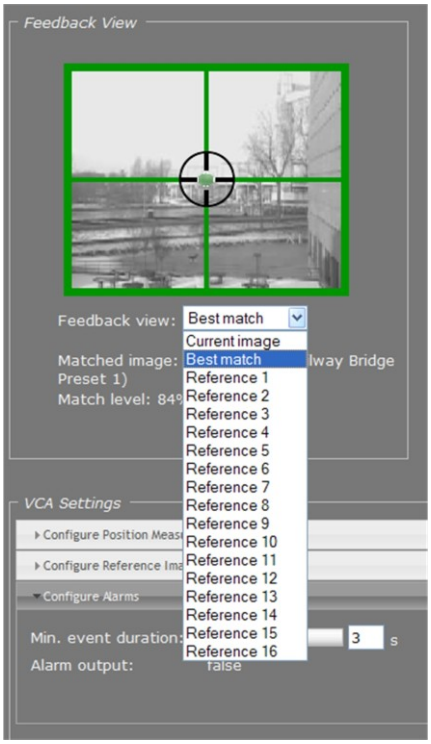


Current image matches Reference 1



Reference image(s) available. No match found with current image, though.

The drop-down list in the Feedback View section can be used to display the current image, the best matching reference image, or a specific reference image.



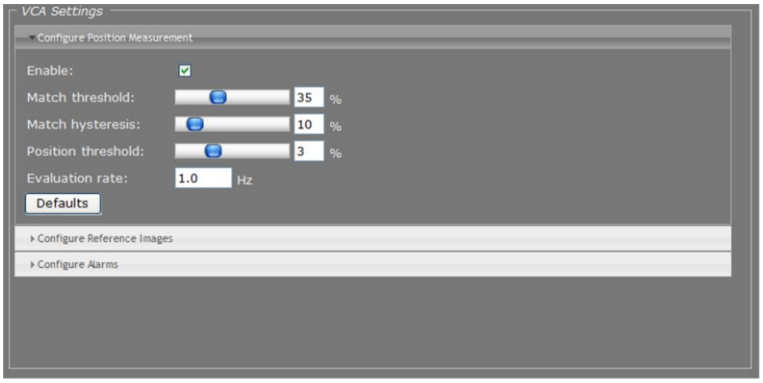
Feedback view list

To delete a reference image

1. In the *VCA Settings* section, open the **Reference image** list.
2. Select the image you wish to delete.
3. Press the **Clear reference** button.

   Note that the *Clear all* button deletes *all* available references.

10.4.8.3 Position measurement



Position Measurement settings

After creating one or more reference images you can configure the Position Measurement settings to define thresholds for allowed camera movement and image matching.

Configure Position Measurement	
Enable	Select or clear to enable or disable the Tampering Detection functionality, respectively.
Match threshold	The current image and the reference image it is compared with are considered a match upon reaching the degree of similarity specified here. The lower the percentage entered for this parameter, the fuzzier the match.
Match hysteresis	This is the margin area where there is either a match or no match, depending on the preceding match level. If your alarm output frequently alternates between "true" and "false" you can use this parameter to fine-tune your settings. For more information on hysteresis, see also *Dial legend* (on page 73).
Position threshold	Determines the amount of camera movement that is allowed before a position alarm is raised. Raising this value allows more camera movement. This is indicated by the increased size of the green circle in the center of the image.
Evaluation rate	The value entered here determines the speed at which the host machine processes the algorithms underlying the measurements. Higher values take up more CPU power.
Defaults	Restores the original settings. Does not affect the current activity status of the Tampering Detector (i.e. being Enabled or Disabled).

10.4.8.4 Alarms

Alarms settings

The Configure Alarms section enables you to view the current status of the alarm output and to set a delay for the activation/deactivation of alarm outputs.

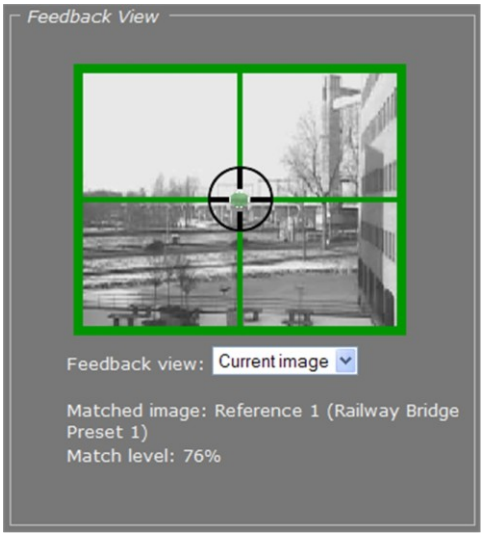
Note: In addition to the status indication in this section, alarms can also be read from the C-54 E-MC 's internal Management Information Base (MIB) using appropriate software.

Configure Alarms

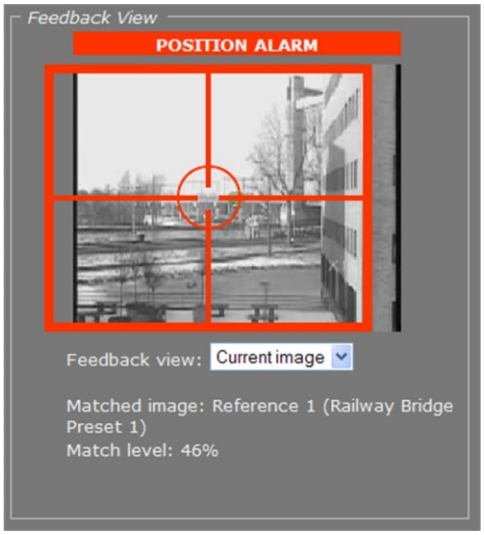
Min. event duration	Alarm output delay time: the time span that is to elapse before a continued change in conditions actually activates/deactivates the alarm output.
Alarm output	*True* or *False*. Indication of current status.

Tip: A PTZ camera moving from one preset to the next may trigger an alarm if the scene change takes too long. Setting an appropriate time for the *Min. event duration* parameter can delay the alarm output until the camera has adopted the new position and the alarm condition has ceased.

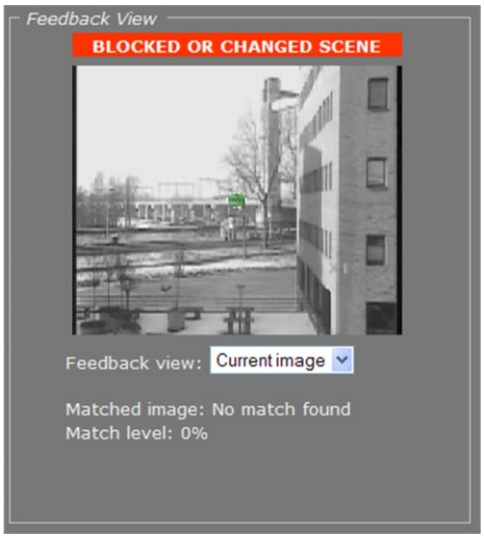
Examples of alarms



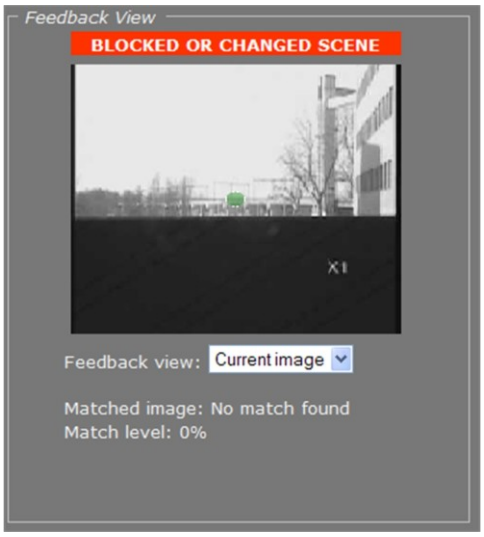
Original camera position



Camera has moved to the right. Although the current image still matches Reference 1, the changed camera position results in a position alarm.

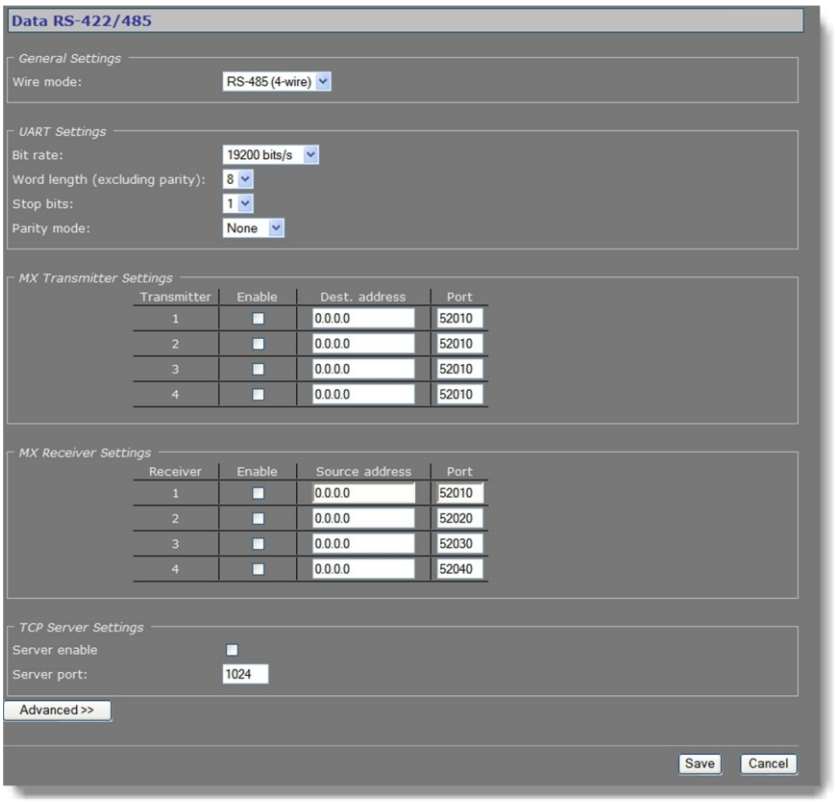


Camera has moved further to the right. Current image no longer matches any reference image, resulting in a changed scene alarm.



Blocked scene alarm

10.5 Data RS-422/485



Data RS-422/485 page. Transmitter and receiver can be configured in the usual manner.

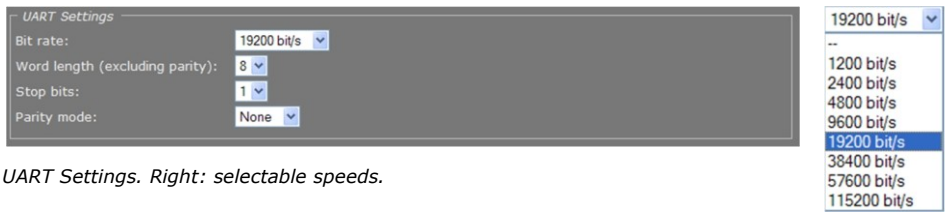
General Settings

Wire mode selection

General Settings

Wire mode	*RS-422*, *RS-485 (2-wire)*, or *RS-485 (4-wire)*. The RS-4xx interface type on the RJ-45 DATA socket is set in software. Select the type of RS-4xx interface from the Wire mode list.

UART Settings



UART Settings. Right: selectable speeds.

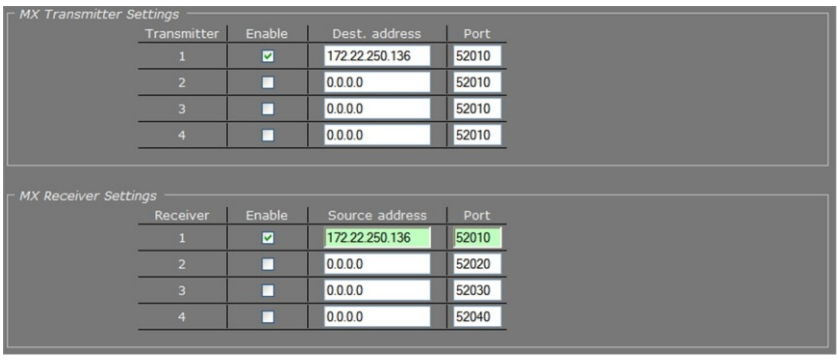
UART

The C-54 E-MC uses a Universal Asynchronous Transmitter/Receiver (UART) for data transmission. The UART will recognize and reproduce the words in the data stream. This is only possible if the UART is programmed to understand the serial data format.

UART Settings

Bit rate	*1200*, *2400*, *4800*, *9600*, *19200*, *38400*, *57600*, *115200 bit/s*. The speed of the digital transmission, that is - the amount of information transferred/processed per unit of time.
Word length (excluding parity)	*5*, *6*, *7*, *8*.
Stop bits	*1*, *2*.
Parity mode	*None*, *Odd*, *Even*, *Mark*, *Space*. This setting should be the same as in the connected device (e.g., a PTZ camera).

Making data connections



MX Transmitter/Receiver Settings

After selecting a data mode (see General Settings) and configuring the interface (see UART Settings), data link configuration is done in the same fashion as described for video links.

To configure a data link

1. In the Transmitter settings section, set at least one destination IP address.
2. Set a port number or leave it at the default.
3. Enable the stream.
4. Click **SAVE** to write the new configuration to the device.

The data interface is bidirectional in the sense that apart from a streams transmitter, a receiver is available on the same codec. However, the data transmitter and receiver are independent of one another, except for the data interface settings.

Do not forget to enable both the transmitter and the receiver, and to configure the UART correctly (see Advanced Settings).

When using multicasting, it is possible for a group of codecs to both send and listen to the same multicast address.

Highlighted fields

The source address and port number fields are highlighted in green when the enabled receiver receives a stream from the specified source. The two fields are marked in red when no stream is received with the receiver enabled and correctly configured.

TCP Server Settings

TCP Server Settings

TCP connections are always bidirectional, so no separate transmitter and receiver settings are needed.

TCP Server Settings	
Server enable	Selecting this box enables the streaming of UART data over TCP using a client/server connection. The server accepts requests from a specific client, or any host if not specified.
Server port	Range: [0...65535].

10.5.1 Advanced Settings

RS-4xx Settings

Advanced Settings, RS-4xx

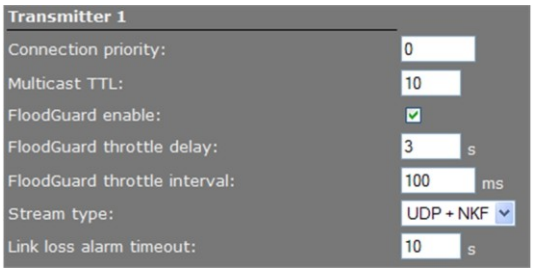
For details about 'data words' and data transfer optimization, see the note below.

RS-4xx Settings

Bit rate	Range: [300...115200]. The speed of the digital transmission, that is - the amount of information transferred/processed per unit of time. Enables you to set a bit rate other than the presets in the UART settings section.
UART gap timeout	Range: [0...255] data words. Will have the next packet sent when the line has remained idle for longer than the timeout.
UART max. latency	Range: [0...255] data words. The maximum latency of the data channel is controlled by forcing a packet to be sent when the first data word of the packet was received longer ago than the number of word times set here.
Line termination enable	Normally, the devices at the two extremes of a bus are terminated, while intermediate devices are not. Therefore: RS-422, always enable (being point-to-point); RS-485, enable only for the first and last module connected to the bus configuration.
Line biasing enable	If biasing is needed (RS-485), it should be enabled on at least 1 module on the bus. RS-422 does not require biasing.

Note on Data Transfer Optimization: A 'word time' is the transmit time for one data word. The amount of time one data word takes to travel on the line is determined by bit rate and word length. Using the *UART gap timeou*t and *UART max. latency* variables you can tailor the data channel for your specific protocol. A delay < 5 milliseconds is possible with minimal settings. One or more data words are bundled in packets. The packaging process influences the performance of the UART mode. At high bit rates, say 115 kbit/s, it may be desirable to adjust some of the low-level UART settings to prevent high CPU loads. At such speeds, a large number of small network packets might increase CPU load by 15%.
The process can be optimized using the RS-4xx settings in the Advanced Settings section. Packets can be sent depending on the configuration of the *UART gap timeout* and *UART max. latency* variables. These can be set such that fewer but larger packets are sent, making the stream simpler to handle, at a considerably lower CPU load. Configuring these settings is often a trade-off between latency (due to packaging) and payload efficiency. In other words, many network packets with a small payload (low latency) versus fewer packets with a large payload (higher latency).
At lower bit rates, a need for smoother PTZ may also require modification of these low-level settings. Note that this depends on the application. For example, PTZ commands must be sent frequently, but require few words. Latency can be minimized by proper fine-tuning of the *UART gap timeout* and *UART max. latency* variables.

Transmitter

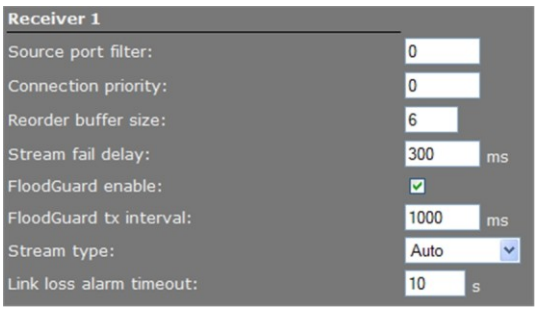


Advanced Settings, Transmitter 1

Transmitter

Connection priority	Parameter intended for use with MX Software Development Kit (MX SDK).
Multicast TTL	Range: [0...127]. Specify the number of routers (hops) that multicast traffic is permitted to pass through before expiring on the network.
FloodGuard enable	Should be on when sending to a unicast IP address, so that an alarm can be generated if no control messages from the receiver have come in for the time set by the FloodGuard throttle delay variable.
FloodGuard throttle delay	Amount of time after which the transmitter will enter throttled mode.
FloodGuard throttle interval	Sets the frequency of empty packets being sent into the network while the transmitter is in throttled mode.
Stream type	The UDP + NKF option will add an extended RTP header for Siqura applications requiring extra information.
Link loss alarm timeout	Range: [1...1000] s. Default: 10 s. Time in seconds before alarm sent.

Receiver

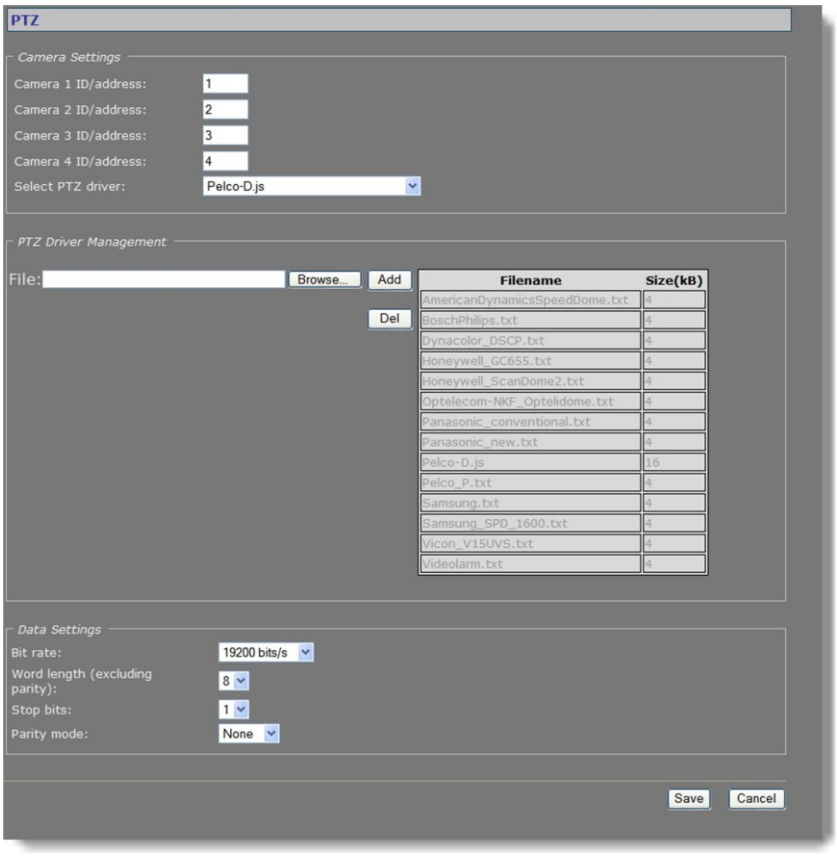


Advanced Settings, Receiver 1

Receiver

Source port filter	Can be used to filter incoming data traffic. With multiple signals sent to the same IP address and destination port number, Source port filter can be used to filter the input, that is - to accept only data from the transmitting port specified here. The filter will not be active if set to 0 (the default and recommended setting).
Connection priority	Parameter intended for use with MX Software Development Kit (MX SDK).
Reorder buffer size	Used to reorder incoming packets.
Stream fail delay	Range: [0...10000] ms. Default: 300 ms. Timeout in ms before going to NoStream state.
FloodGuard enable	Should be on, to enable the sending of control messages.
FloodGuard tx interval	Interval at which the receiver sends control messages to the transmitter (see the section on FloodGuard).
Stream type	The UDP + NKF option will add an extended RTP header for Siqura applications requiring extra information.
Link loss alarm timeout	Range: [1...1000] s. Default: 10 s. Time in seconds before alarm sent.

10.6 PTZ



PTZ page

10.6.1 Enabling PTZ camera control

A PTZ camera connected to the C-54 E-MC can be controlled with the PTZ Control Panel on the Live Video page. PTZ camera control is enabled by selecting a driver that is supported by the camera. If the required driver is not included in the PTZ driver list, you can upload it to the C-54 E-MC (see below).

To enable PTZ control

1. In the Camera Settings section, specify the Camera ID/address.
2. From the PTZ driver list, select the protocol supported by the PTZ camera you wish to control.
3. Click **Save**.

   You can now control the camera with the control panel on the Live Video page.

10.6.2 Uploading/Removing PTZ drivers

To upload a PTZ driver

1. In the *PTZ Driver Management* section, click **Browse**.
   The *Open* dialog displays.
2. Browse to the folder containing the driver.
3. Select the appropriate file (`.txt` or `.js` extension), and then click **Open**.
   The driver displays in the *File* text box.
4. Click the **Add** button.
   The driver is added to the list of available drivers in the *PTZ Driver Management* and *Camera Settings* sections.

To remove a PTZ driver

1. In the *PTZ Driver Management* section, select the driver you wish to remove.
2. Click the **Del** button.

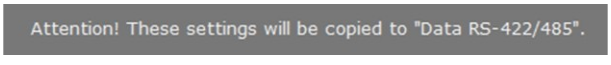
10.6.3 Data settings

PTZ page, Data Settings

Data Settings

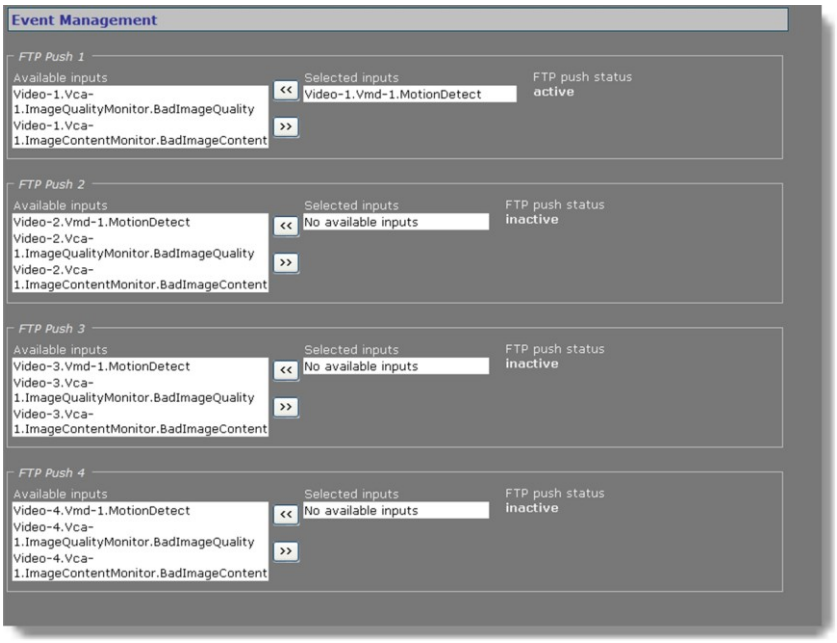
Bit rate	*1200*, *2400*, *4800*, *9600*, *19200*, *38400*, *57600*, *115200 bit/s*. The speed of the digital transmission, that is - the amount of information transferred/processed per unit of time.
Word length (excluding parity)	*5*, *6*, *7*, *8*.
Stop bits	*1*, *2*.
Parity mode	*None*, *Odd*, *Even*, *Mark*, *Space*. This setting should be the same as in the connected device (e.g., a PTZ camera).

Note: Changes you make in the Data Settings section are copied to the RS-422/485 page.



Changes in the Data Settings section will affect Data RS-422/485 settings

10.7 Event Management



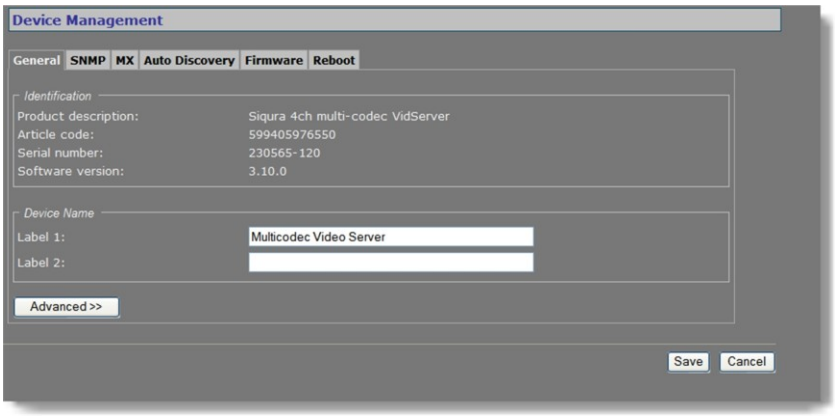
Event Management page

Associating events with FTP Push

If FTP push is configured to be event-triggered (on page 68), you need to select one or more sources on the Event Management page that will activate an image upload to the FTP server(s).

FTP Push #	
Available inputs	List of sources that can be selected as triggers for an FTP push.
Selected inputs	On selection of multiple inputs, the inputs are connected with a logical OR. Any one will cause an image upload to the FTP server.
FTP push status	*Inactive (open)* or *active (closed)*. Active: one or more of the selected inputs is true. Inactive: none of the selected inputs is true.

10.8 Device Management



Device Management page, General tab

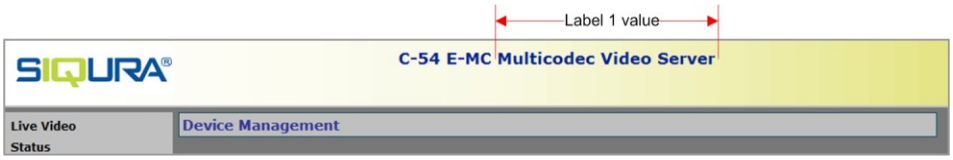
10.8.1 General tab

Identification

This section offers administrative module information.

Device name

Label 1 Label 2	The Device name section contains label settings, which can be edited and saved. Values entered for the Label 1 and Label 2 variables are stored in the Management Information Base (MIB) of the module. The labels jointly constitute the device label, a user-friendly name for the physical device, which will serve to identify and address the module on the network when working with the MX network service and MX applications. The current value for Label 1 is displayed in the upper pane of the web pages.



Label 1 value in Title pane

10.8.1.1 Advanced Settings

Device Management: Advanced Settings

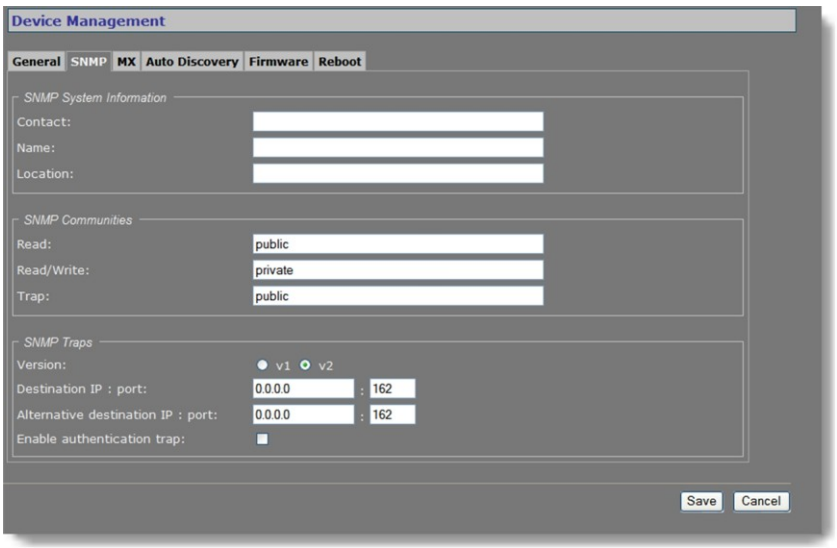
Alarm Settings

Board temperature alarm	A notification will be issued on the network when the temperature value set here is exceeded. Module alarms can be read and processed using additional Siqura software (which will also enable you to configure alarm levels and destinations).

Identify

Flashing DC LED	Range: [0 …1000]. To identify a C-54 E-MC, when housed in a rack among other units, for instance, enter a value and click **Save**. The DC LED on this particular unit will blink for the number of seconds you set.

10.8.2 SNMP tab



Device Management page, SNMP tab

SNMP MIB

To prepare a C-54 E-MC for SNMP management, the database documenting the C-54 E-MC variables that can be read or modified must be registered with the program; such SNMP MIB documents (indicated OPTC) are available from Siqura or from its web site.

SNMP System Information

The SNMP System Information section shows the network/device data specifically made available to the SNMP manager for making the device, its location and service manager(s) traceable. The module has an SNMP Agent running which listens on port 161.

SNMP Communities

The community strings (names which can be regarded as passwords) in the SNMP Communities section must conform to those configured in the SNMP manager. Often, these are 'public', mainly used for the read and trap communities, and 'private' or 'netman', for read-write operations. The manager program may offer additional choices.

SNMP Traps

A C-54 E-MC alarm status change will generate a trap which can be caught by any SNMP manager. *Version* and *Destination IP : port* are required fields.

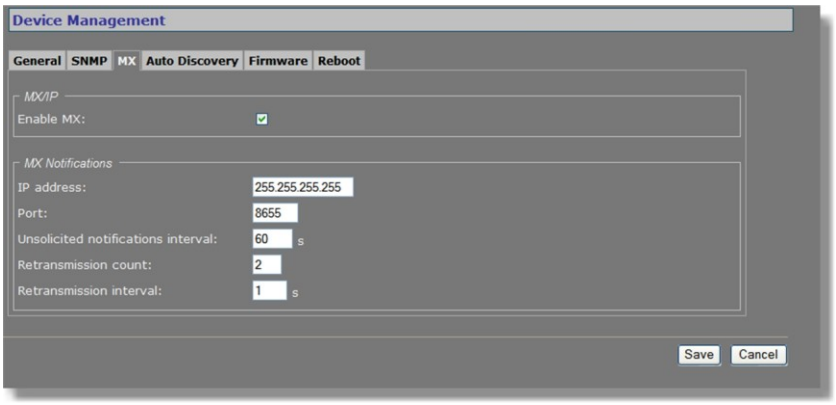
SNMP Traps

Version	The SNMP version used.
Destination IP : port	The IP address associated with the manager program, and the destination port (162 is the default port).
Alternative destination IP : port	If desired, an alternative destination IP address and port can be added.
Enable authentication trap	It is possible to add an authentication trap to be able to catch attempts at access using the wrong community string.

Polling

Depending on facilities offered by the SNMP manager, a number of variables can be read out and in a few cases be edited and set. The Ethernet port variables are contained in the 'system' and 'interfaces' sections of *RFC 1213-MIB* (*http://www.ietf.org/rfc/rfc1213.txt?number=1213*).

10.8.3 MX tab



Device Management page, MX tab

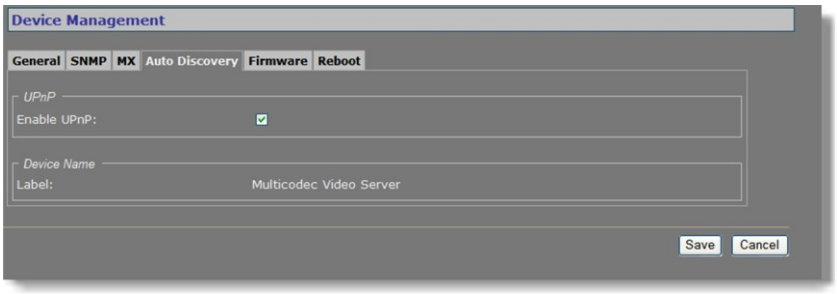
MX/IP

MX/IP is a UDP protocol used to communicate with Siqura equipment over a network connection. The Siqura Software Suite applications use the MX/IP protocol to access, configure, and control Siqura network devices.

MX/IP	
Enable MX	In addition to the proprietary MX/IP protocol, a C-54 E-MC can be accessed, configured and managed using a variety of open standards. Therefore, you can disable the MX protocol. Be aware that doing so will prevent you from upgrading the C-54 E-MC firmware through the MX Firmware Upgrade Tool application.

MX Notifications	
IP address	With 255.255.255.255 as the IP address for the manager, the MX notifications would be broadcast over the subnet.
Port	Generally, the MX notifications port must not be modified.
Unsolicited notifications interval	Sends the module status as MX notification at the specified interval to be picked up by a management program.
Retransmission count	If desired, notifications can be retransmitted. With a retransmission count value of 2, the actual number of transmissions equals 3 (including the original transmission).
Retransmission interval	Sets the frequency of retransmissions.

10.8.4 Auto Discovery tab



Device Management page, Auto Discovery tab

Advertising the C-54 E-MC on the network

On the Auto Discovery tab you can enable UPnP (Universal Plug and Play). If enabled, UPnP will allow the C-54 E-MC to advertise its presence and services to control points on the network. A control point can be a network device with embedded UPnP, a VMS application or a spy software tool (for example, Device Spy).

Note on UPnP: The goal of Universal Plug and Play (UPnP), a set of computer network protocols, is to enable peer-to-peer simple and robust connectivity among stand-alone devices and PCs from different vendors. UPnP networking involves (some or all of) the following steps.

Step 1: *Discovery*. Devices advertise their presence and services to a control point on the network. Control points can search for devices on the network. A discovery message is exchanged, containing a few essential specifics about the devices, e.g. its type, identifier and a pointer to more detailed information.

Step 2: *Description*. The control point can request the device's description from the URL provided in the discovery message. The device description is expressed in XML and includes vendor-specific information, such as the model name, serial number, manufacturer name, URLs to vendor-specific web sites.

Step 3: *Control*. The control point can send actions to a device's service.

Step 4: *Event*. The control point listens to state changes in the devices.

Step 5: *Presentation*. If a device has a URL for presentation, the control point can display a page in a web browser, and – if the page offers these capabilities - allow the user to control the device and/or view the device status.

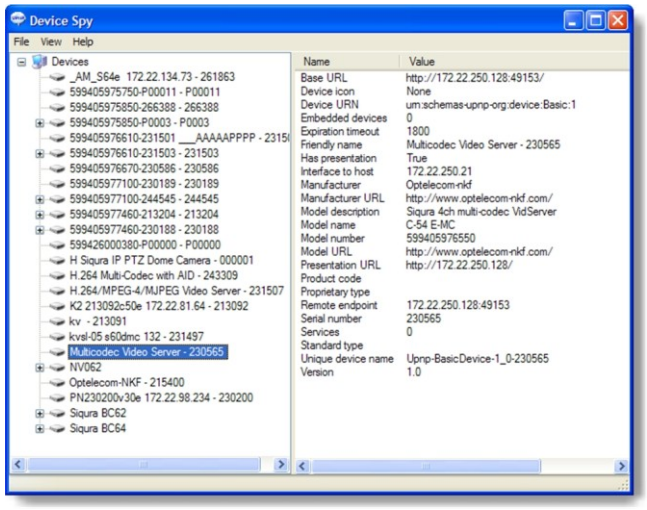
The C-54 E-MC supports the following Universal Plug and Play (UpnP) functionality: Discovery, Description (partly supported), and Presentation.

Testing the C-54 E-MC's UPnP functionality

After enabling UPnP, you can use a tool, such as Device Spy (included in the 'Developer Tools for UPnP Technologies'), to check if the C-54 E-MC correctly advertizes its presence and device description on the network.

To view the C-54 E-MC device description in Device Spy

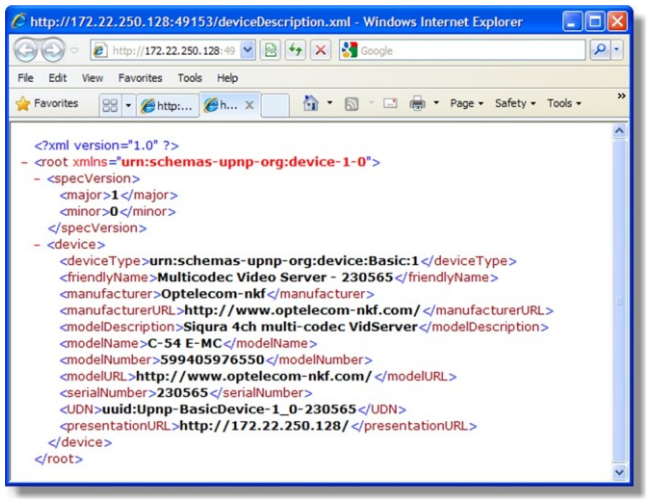
1. Start Device Spy.
   The network is scanned.
   A list of detected UPnP devices displays in the left-hand panel.
2. Select your C-54 E-MC in the left-hand-panel.
   The device description is shown in the right-hand panel.



C-54 E-MC device description in Device Spy

To view the C-54 E-MC device description in XML (using Device Spy)

1. Start Device Spy.
2. In the left-hand panel, right-click the C-54 E-MC entry.
3. Select **Get Device XML**.
   The XML device description opens in your web browser.



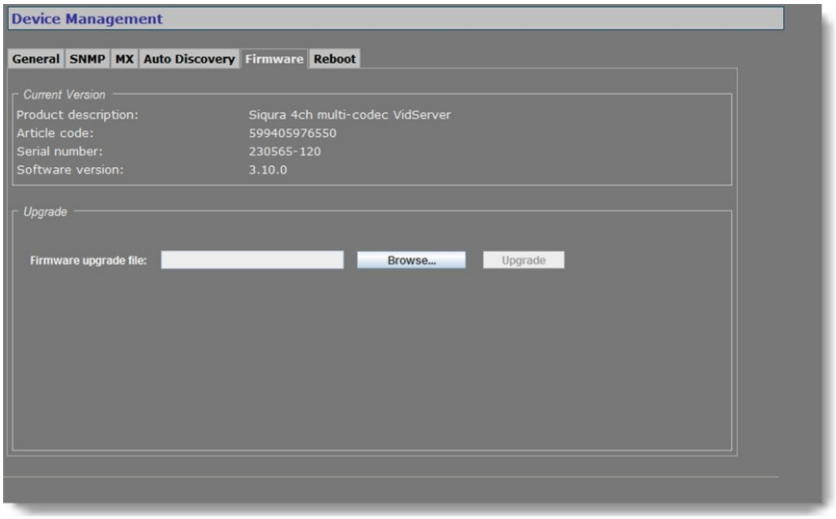
C-54 E-MC XML device description

To access the C-54 E-MC's web pages via Device Spy

1. Start Device Spy.
2. In the right-hand panel, double-click the **Presentation URL** entry.
   -or-
   In the left-hand panel, right-click the C-54 E-MC entry, and then select **Display Presentation Page**.
   The login page of the C-54 E-MC displays in your browser.

Note: Do not double-click the Base URL entry in the Details pane. The connection will not be made, due to an incorrect port number. Use the Presentation URL instead.

10.8.5 Firmware tab



Device Management page, Firmware tab

Note: The first time you access the Firmware tab after opening your web browser, you are asked to authenticate. Next, a security alert displays. Using the C-54 E-MC firmware upgrade feature requires Java Runtime Environment 1.6 or higher. The Siqura application does not give rise to any security risks. You can run it safely.

Firmware images

The C-54 E-MC has two firmware storage areas: a *fixed image* area and an *upgrade image* area. The fixed image area contains the original factory version of the firmware. This cannot be erased. The upgrade image area is usually empty upon factory release.

If the existing firmware in the C-54 E-MC is to be replaced, a new version can be written to the upgrade image area. There, the new image resides in erasable (flash) memory.

An upgrade image can replace an existing upgrade image written to the device at an earlier upgrade. It is essential that the upgrade image is compatible with the C-54 E-MC.

Important: If an error should occur during the upgrade procedure, the C-54 E-MC will not revert to a former upgrade image. Instead, it will be downgraded to the fixed image.

Current version

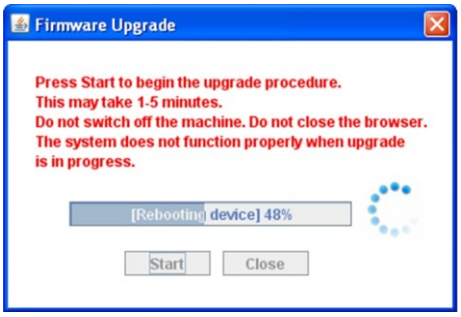
This section offers information on the currently active firmware version.

Upgrade

This section enables you to upgrade the firmware residing in the upgrade image area.

To upgrade the C-54 E-MC firmware

1. On the *Device Management* web page, open the **Firmware** tab.
2. In the *Upgrade* section, click **Browse**.
   The *Open* dialog box displays.
3. Browse to the folder containing the firmware image.
4. Select the appropriate file (`.nkffw` extension), and then click **Open**.
   The Article code and Software version appear in the *Upgrade* section.
5. Click **Upgrade**.
6. In the *Firmware Upgrade* dialog box, click **Start**.
   A progress bar informs you on the task's completion percentage.
7. Upon completion, click **Close**.


Firmware Upgrade
Press Start to begin the upgrade procedure.
This may take 1-5 minutes.
Do not switch off the machine. Do not close the browser.
The system does not function properly when upgrade is in progress.
[Rebooting device] 48%
Start
Close

Firmware upgrade progress

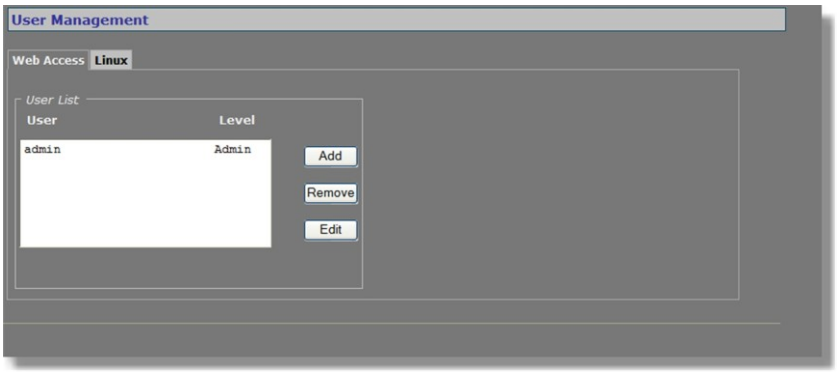
10.8.6 Reboot tab

Device Management page, Reboot options

Reboot

Reboot	Reboots the unit without resetting variables.
Reset to factory settings: keep network settings	Reset option for all variables that can be set by the user, with the exception of the network settings.
Reset to factory settings; incl. network settings	A complete reset which will restore the unit's settings, including the IP address/subnet mask, to their original, default values. This could make the unit unreachable for in-band communications, in which case the internal web pages are accessible only by (temporarily) moving a PC to the same subnet as the C-54 E-MC.

10.9 User Management



User Management page, Web Access

Tabs

The User Management page is available to users with an Admin account. It has two tabs: *Web Access* and *Linux*.

10.9.1 Web Access tab

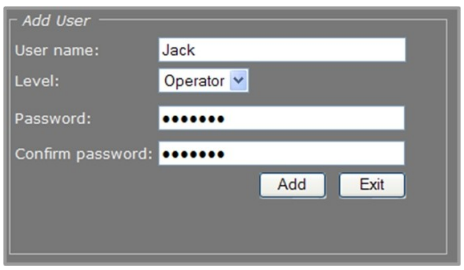
Three-level access control

The C-54 E-MC has three levels of access to the internal web pages. User groups are: *Administrators*, *Operators*, and *Viewers*. Do *not* use the name of one of these groups as a user name. Out of the box, the unit has no user accounts configured. The C-54 E-MC supports up to 20 users at a time.

Managing user accounts

To add a user

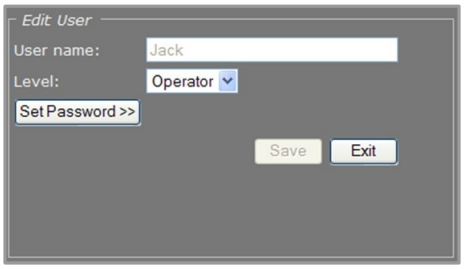
1. On the *User Management* page, open the **Web Access** tab.
2. In the *User List* section, click **Add**.
   The *Add User* section displays.
3. Enter the new user name (alphanumeric and underscore only) and password. Confirm the password to prevent errors.
4. Select the appropriate access level.
5. To write the settings into the unit, click **Add**.
   The user is added to the *User List*.



Adding a user

To edit a user

1. On the *User Management* page, open the **Web Access** tab.
2. Select the user name from the *User List*, and then click **Edit**.
   The *Edit User* section displays.
3. Modify the user name, permission level, and/or password.
4. To write the settings into the module, click **Save**.

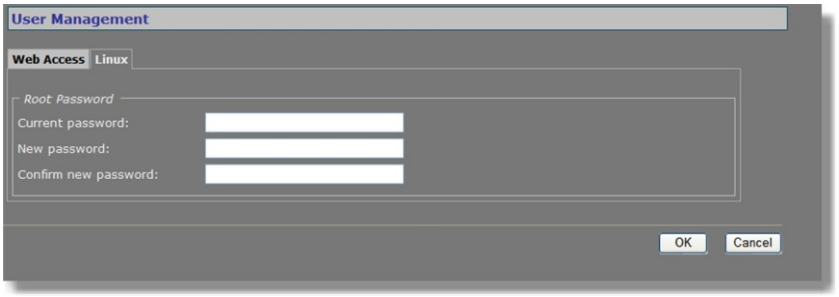


Editing a user

To delete a user

1. On the *User Management* page, open the **Web Access** tab.
2. Select the user name from the *User List*, and then click **Remove**.
3. To confirm the deletion, press **OK**.

10.9.2 Linux tab

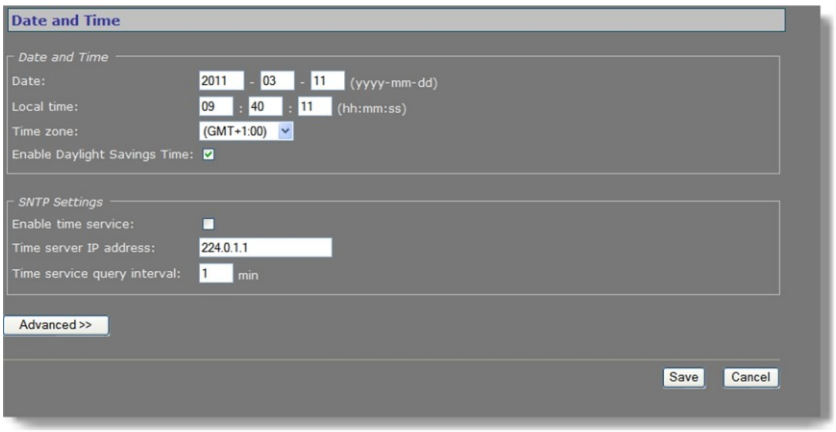


User Management page, Linux tab

Root password

The root account is a special account that can be used for system administration. The account is always present and should be password protected at all times. The root password, which is required when logging on to Linux with root authority, is empty by default. Using the Linux tab an admin can set or change the root password. Should you have forgotten the password to your admin account and be locked out of the system, you can regain access by logging in as root with a valid root password. Through the root account you can then reset the admin password.

10.10 Date and Time



Date and Time settings

Date and Time

The C-54 E-MC has a battery-supported real-time clock that can be adjusted either manually (as shown above), or automatically with the aid of an SNTP (Simple Network Time Protocol) server. After entering changes, press Save to make them permanent.

The date and/or time are displayed on screen if enabled on the OSD tab of the Video page. The on-screen position and color of the text are governed by the relevant OSD settings.

The C-54 E-MC adds 1 hour to the local time when Daylight Savings Time is enabled. The unit does *not* automatically change between summer and winter time. The user has to set the proper state in the Date and Time section of the web page (or use an MX/IP commmand).

SNTP Settings

If enabled, the SNTP server is queried automatically by the internal clocks, with a configurable time interval.

To set up the C-54 E-MC for use with an SNTP server

1. In the *SNTP Settings* section, clear the **Enable time service** check box, and then click **Save**.
2. On the *Time zone* list, select your local zone.
3. Select **Enable Daylight Savings Time**, if required.
4. Click **Save**, and then wait for 2 seconds.
5. Set the **Date** and **Local time** values.
   A maximum error of 5 minutes is allowed for these settings.
6. Click **Save**.
7. In the *SNTP Settings* section, select the **Enable time service** check box, and then click **Save**.
   The unit will now synchronize (within the interval set in the SNTP Settings section) to the time server and remain synchronized, also after reboots.

Notes for advanced users

- Far off (more than a few minutes) or jumping time server values may be rejected by the unit.
- You should *never* test the tracking to the time server by changing the time in the NTP server. You can only test it by leaving Time Service mode, changing "Local Time" slightly (max 5 minutes), and then enabling Time Service mode again.
- After detecting a negative time jump (between 0 … -1 hour), when connecting to the NTP server, for example, the next NTP client update cycle will be delayed for that time plus the normal polling interval. You may disable, and then enable NTP mode to immediately synchronize.
- Changing the local time may sometimes trigger a reboot of the unit. The time will be correct after the reboot.

10.10.1 Advanced Settings

Date and Time: Advanced settings

Advanced Settings	
User defined time zone	Enables you to enter a custom time zone. The Time zone list in the Date and Time section indicates "User defined" on entering and saving a custom value.

11 Multicasting, Multi-Unicasting, and Port Numbers

The C-54 E-MC can be used in a multicast setting. This chapter outlines IP multicasting and one of its methods in particular: source-specific multicast. It then describes the concept of multi-unicasting. You also learn about assigning valid port numbers.

In This Chapter

Multicasting 105
Multi-Unicasting 106
Port Numbers 106

11.1 Multicasting

IP multicast

The C-54 E-MC supports IP multicast. This is a method for 'one-to-many' real-time communication over an IP network. The technique can be used to send C-54 E-MC media streams to a group of interested receivers in a single transmission. The intermediary network switches and routers replicate the data packets to reach the multiple receivers on the network. The switches and other network devices used must be carefully configured for, and capable of handling multicasting and its associated protocols (most notably IGMP). Packets should be sent over each link in the network only once. If not, broadcasting will occur, which can put a very heavy load on the network. This is a phenomenon inherent to multicasting and the facilities of network devices, not of the C-54 E-MC itself, although it is compounded by the density of the UDP streams used.

Multicast group

A multicast group is used by the source, that is - the C-54 E-MC, and the receivers to send and receive multicast messages. To define a multicast group, the source unit should be assigned a valid multicasting ('destination') TX stream address and the destination units should get this same address as source. IPv4 uses the address range 224.0.0.0 through 239.255.255.255 for multicast applications. The source unit has no knowledge of how many receivers there are. The group vanishes when the source is disabled, but the source will *not* automatically be disabled when the last remaining destination is cancelled and will keep transmitting at least towards the nearest switch. Additionally, it is possible to have the multicast group units send unsolicited membership reports, keeping it alive even if only one - any - unit of the group is still active.

Source-specific multicast

The C-54 E-MC also supports source-specific multicast (SSM). This technique allows a receiver to specify a specific source sending to the multicast group and receive traffic originating from that source only. Singling out the source in this way can considerably reduce the network load. Note that SSM must be supported by the last-hop router and the receiver's operating system, and that the receiver requires IGMPv3 to be able to specify the specific source.

SSM is implemented on the encoder side, by having the unit transmit a multicast stream to the 232.x.x.x group (the range assigned to SSM) via RTSP. The Session Description Protocol (SDP) file generated by the RTSP server includes additional information containing the source IP (S) and the multicast group (G). The RTSP client in the decoder can then issue an IGMP join message containing S and G. The intermediary routers can use this information to determine the shortest path between encoder and decoder to route the multicast stream. On the decoder side, the user requests a stream from the encoder, using an SSM aware RTSP client (such as VLC, for example).

For more information on source-specific multicast, refer to the following.

http://tools.ietf.org/pdf/rfc4607.pdf
http://tools.ietf.org/pdf/rfc4570.pdf
ftp://ftp.rfc-editor.org/in-notes/pdfrfc/rfc3569.txt.pdf
http://www.rfc-editor.org/rfc/pdfrfc/rfc5760.txt.pdf

11.2 Multi-Unicasting

As an alternative to multicasting, the C-54 E-MC features 'multi-unicasting', that is - sending out up to 4x2x3 independent copies of video, and sending and receiving four data streams. If the bit rates selected are moderate, it may be more convenient to use this mechanism instead of multicasting, even though the network gets more signal to carry from the encoder.

When such a destination is removed, the source also stops sending the corresponding stream. If the input channel of a destination is disabled without disabling the source, source transmission will be throttled, but not disabled (this behavior is selectable through the FloodGuard settings). The source downsizes the stream by sending empty UDP packets until a wake-up call is received. The empty packets, of course, carry the relevant IP/port information.

11.3 Port Numbers

A valid UDP port number in a Siqura A-, C-, S-, and V-series system is an unsigned 16-bit integer between 1024 and 65536. Generally, you do not need to select other than the default receiver port numbers as given in the MIB (Management Information Base). If you want to change these receiver port numbers for some reason, use even numbers. A given receiver port number N is associated with the port number N+1, through which control information is returned to the source.

Eligible port numbers in general are within the range indicated above, with some exceptions. Those within the 3000-10000 range are reserved and/or hard-coded, or may become reserved, so only 10000-65535 are generally safe. Default port numbers (used by receivers) are shown in the following table.

General		Example	
Video	50xxx	Video	50010
Audio	51xxx	Audio	51010
Data	52xxx	Data 1	52010 (RS-4xx)
		Data 2	52020 (RS-232)
CC	53xxx	CC 1	53010
		CC 2	53020

Default port numbers

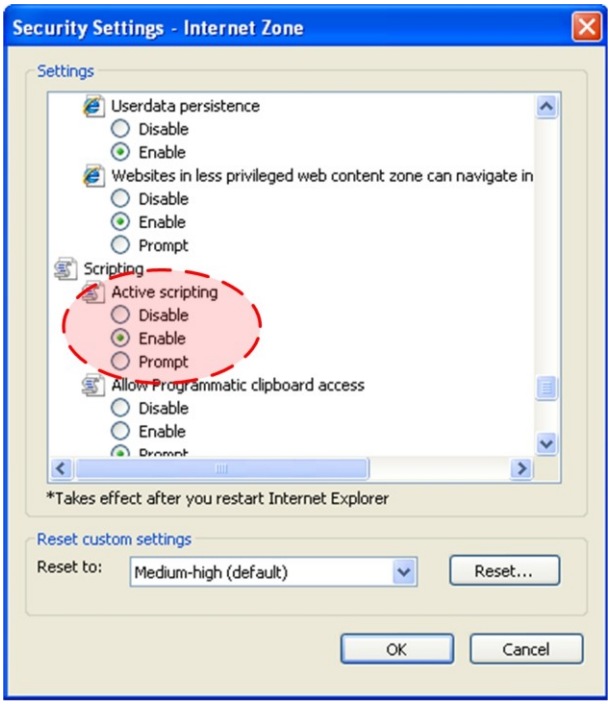
Siqura MX applications using automatic port number allocation may use 55000 and up.

12 Appendix: Enabling JavaScript

In order for the C-54 E-MC web pages to display correctly, JavaScript must be enabled in your web browser.

To enable JavaScript in Internet Explorer

1. From Internet Explorer's Tools menu, select **Internet Options**.
2. On the *Security* tab, click the Internet globe icon, and then click **Custom level**.
3. In the *Settings* list, search for Active scripting and select **Enable**.
4. Click **OK**, and then close the *Internet Options* dialog box.



Active scripting enabled

13 Appendix: Video Player Plug-In Installation

Viewing video streams on the C-54 E-MC web pages requires a video player installation on the machine running the web browser. This appendix provides instructions for installing QuickTime and VLC, the video plug-ins supported by the C-54 E-MC.

In This Chapter

QuickTime..... 109
VLC..... 110

13.1 QuickTime

QuickTime is the default video player. If this plug-in is not detected on opening a video stream on the Live Video page, a security warning enables you to install the software.

Internet Explorer - Security Warning
Do you want to install this software?
Name: QuickTime
Publisher: Apple Inc.
More options
Install
Don't Install
While files from the Internet can be useful, this file type can potentially harm your computer. Only install software from publishers you trust. What's the risk?

IE security warning

Alternatively, QuickTime (and VLC) can be installed using the download link that appears on attempting to open a video stream on an Encoder tab.

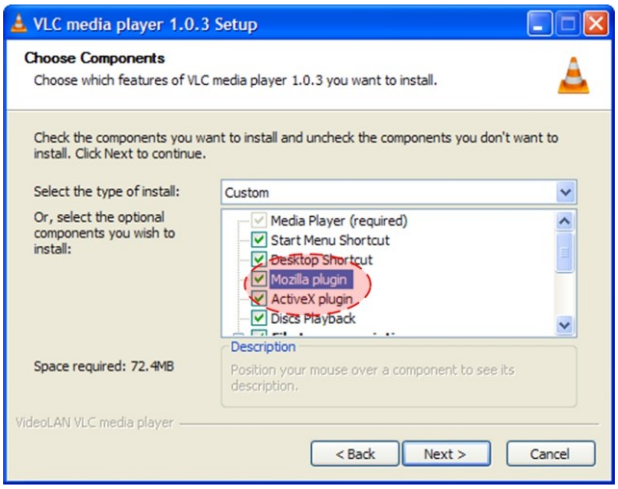
No Video player plugin
has been detected !
You can download the VLC player here
You can download the Quicktime player here

Video player download links

QuickTime installation itself is straightforward and self-explanatory.

13.2 VLC

VLC installation requires special attention. When installing this software, make sure you select the Mozilla plug-in and ActiveX plug-in components in the VLC Setup wizard.


VLC media player 1.0.3 Setup
Choose Components
Choose which features of VLC media player 1.0.3 you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select the type of install:
Custom
Or, select the optional components you wish to install:
Media Player (required)
Start Menu Shortcut
Desktop Shortcut
Mozilla plugin
ActiveX plugin
Discs Playback
Description
Position your mouse over a component to see its description.
Space required: 72.4MB
VideoLAN VLC media player
< Back
Next >
Cancel

Required components: Mozilla and ActiveX plug-ins

Warning: Do not use VLC v0.8.6f. This version will stop running after 30 seconds. The C-54 E-MC has been successfully tested with VLC v1.1.7.

VLC and Windows Vista

To configure VLC media player settings when running this plug-in on a Windows Vista PC.

1. Open the VLC media player.
2. On the **Tools** menu, select **Preferences**.
3. In the Show settings section (lower left corner), select **All**.
4. Expand the **Video** option and select **Output Modules**.
5. In the Video output module list, click either DirectX video output, OpenGL video output, or Windows GDI video output.
6. Expand **Output Modules** and click **DirectX**.
7. Clear the **Use hardware YUV > RGB conversions** check box.
8. Save your settings.

14 Appendix: Technical Specifications

Siqura C-54 E-MC	4-channel multicodec video server	
VIDEO		
Video channels	4x PAL/NTSC auto detect	
Input level	1 Vpp (+/- 3 dB)	
Compression algorithm	MPEG-2 (ISO/IEC 13818-2), MJPEG, MPEG-4 (ISO/IEC 14496-2, ISMA comp.)	
Type of streaming	UDP/IP (Unicast, multicast, multi-unicast)	
Number of output streams	Up to 40 (streams total for 4 channels)	
Input impedance	75 Ω or Hi-Z	
Encoding latency	<130 ms	
Resolution	D1, 2/3D1, 1/2D1, 2CIF, CIF, QCIF, VGA, or custom X-/Y-resolution via Advanced Settings	
GOP structure	I, IP	
Frame rate	1 to 30 fps	
Triple streaming	25/30 fps MPEG-2	2xD1 + MJPEG
	25/30 fps MPEG-4	1xD1 + 1x 2CIF + MJPEG
	25/30 fps MPEG-2/MPEG-4	1x 2/3D1 + 1x 2/3D1 + MJPEG
Output data rate	Up to 14 Mb/s per channel (CBR or VBR selectable)	
Video parameters	User profiles, contrast, brightness, hue, saturation, and sharpness	
Video overlay	3x text lines (fully configurable), 1x graphical image (BMP, GIF, or JPEG)	
Live View Encoder	HTTP, FTP pull, FTP push	
Connector type	BNC (gold-plated centerpin)	
DATA		
Number of channels	1x (full duplex)	
Interfaces	1x RS-422/485 (2- or 4-wire)	
Stream	4x TX, 4x RX, TCP/UDP/MX configurable	
Data rate	300 b/s to 115 kb/s	
Connector type	RJ-45	
VIDEO ANALYTICS		
VMD	Based on movement detection in free-drawn ROI, per input	
CAMERA HEALTH CHECK		
Tamper detection	In free-drawn ROI: blocked and partially blocked view, spraying, cloaking, position changed, per input	
Image quality monitoring	In free-drawn ROI: focus, contrast, exposure, and noise measurement, per input	

Siqura C-54 E-MC	4-channel multicodec video server
TRANSMISSION INTERFACE	
Number of interfaces	1x
Interface	10/100Base-TX Fast-Ethernet, Autonegotiation, HD/FD, 10/100 Mb selectable
SFP option	Empty SFP slot for 100 Mbps SFP devices
Protocols	MPEG-2 TS, MPEG-4 ES, (M)JPEG, RTP, RTSP, RTCP, TCP, UDP, IP, DHCP, SNMPv2, IGMPv2, (S)NTP, MX/IP, HTTP, SAP, UPnP, DiffServ, TelNet, FTP
Connector type	RJ-45
MANAGEMENT	
LED status indicator	Power on and operational
DC	Power-on indicator (green)
NV	No video on input (red)
Sync	All links are operational (green); failure in RX stream(s) (yellow); failure in TX stream(s) (red)
Ethernet port	Green LED: on=100 Mb, off=10 Mb; Amber LED: on=link okay, flashes with activity
Network management & Control	SNMP, MX™, HTTP API, HTML (Password protected)
POWERING	
Power consumption	<9W
Stand-alone units (/SA)	11 to 19 VDC (PSA-12DC/25 or PSR-12 DC)
ENVIRONMENTAL	
Operating temperature	-40°C to +74°C (-40°F to +165°F)
Relative humidity	<95% no condensation
MTBF	>200,000 hours
Safety & EMC	IEC/EN 60950-1, IEC/EN 60825, IEC/EN 61000, EN 50130-4, EN 50081-1, EN 55022, FCC part 15
Vibration & shock	EN 50155, EN 61373
MECHANICAL	
Dimensions (h x w x d)	128 x 34 x 190 mm (5.04 x 1.34 x 7.5 in.)
Housing	Rack-mount or stand-alone
Weight (approx.)	450g (15.80 oz.)

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